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Volume 21&22

April 2005 (a}zfv @)^@)

NEWS BULLETIN

OF

NEPAL GEOLOGICAL SOCIETY

NEPAL GEOLOGICAL SOCIETY

(EST. 1980)

PO Box 231, Kathmandu, Nepal

Email: info@ngs.org.np

Website:http://www.ngs.org.np

Hearty congratulations to
Nepal Geological Society for its
25th anniversary
and
wishing to all members of NGS
happy and prosperous new year 2062!

Reducing Earthquake Risk means:

1. **Improving emergency response planning and capability.**
2. **Improving awareness of issues relating to earthquake risk.**
3. **Integrating seismic resistance into the process of new construction.**
4. **Improving the earthquake safety of school children and school buildings**
5. **Improving the seismic performance of existing buildings.**
6. **Improving the seismic performance of utility and transportation systems.**
7. **Increasing experts' knowledge of the earthquake phenomenon, vulnerability, consequences and mitigation techniques.**
8. **Preparing for long-term community recovery following damaging earthquakes.**

NSET aims to assist all communities in Nepal to become safer against earthquake by 2020 AD by developing and implementing organised approaches to managing earthquake risk.

We understand that this challenge can be achieved only through partnership between communities and institutions.

National Society for Earthquake Technology - Nepal (NSET-Nepal)

GPO Box 13775

Kha 2-731, Mahadevsthan, Baneshwor, Kathmandu-10 , NEPAL

Tel. +977-1-474 192; Fax: +977-1-490 943

E-mail: nset@nset.org.np

http://www.nset.org.np

http://www.adpc.ait.ac.th/audmp/nepal/nepal.html

http://www.geohaz.org/kvermp.html

Editorial

We are pleased to bring out this News Bulletin on the auspicious occasion of the **25th Anniversary (Silver Jubilee)** of the **Nepal Geological Society**. We also extend our hearty felicitations to our readers on the occasion of **Happy New Year 2062 BS.** Owing to some unavoidable circumstances, we have combined the two issues (Vol. 21 and 22) of the News Bulletin. However, we will concentrate our efforts towards making it a regular publication in the future.

We express our best wishes to the participants of the forthcoming **Fifth Asian Regional Conference on Engineering Geology for Major Infrastructure Development and Natural Hazards Mitigation** and hope that the conference becomes a grand success.

We thank all the authors for contributing their papers to this News Bulletin. We appreciate the constant support and co-operation extended by the members of Nepal Geological Society during the preparation and publication of this News Bulletin, other journals, and brochures. We are also grateful to the consulting firms, agencies, and organisations that provided with technical and financial support to the **Nepal Geological Society.**

Thank you.

– Editors

LIST OF PUBLISHED JOURNAL OF NEPAL GEOLOGICAL SOCIETY

S.N.	Journal of the Society	Cost (NRs.)
1.	Journal of Nepal Geological Society, Vol. 30 (Special Issue), December 2004, (Proceedings of Fourth Nepal Geological Congress, 9-11 April 2004)	500.00
2.	Journal of Nepal Geological Society, Vol. 29, June 2004	500.00
3.	Journal of Nepal Geological Society, Vol. 28, June 2003	500.00
4.	Journal of Nepal Geological Society, Vol. 27 (Special Issue), September 2002, (Proceedings of Third Nepal Geological Congress, 26-28 September 2001, Kathmandu, Nepal)…	500.00
5.	Journal of Nepal Geological Society, Vol. 26, June 2002	500.00
6.	Journal of Nepal Geological Society, Vol. 25 (Special Issue), December 2001 (Proceedings of workshop on the Himalayan Uplift and Palaeoclimatic Changes in Central Nepal, 10 November 2000)	500.00
7.	Journal of Nepal Geological Society, Vol. 24 (Special Issue), September 2001, (Abstract Volume of Third Nepal Geological Congress, 26-28, September 2001)…….	300.00
8.	Journal of Nepal Geological Society, Vol. 23, June 2001	300.00
9.	Journal of Nepal Geological Society, Vol. 22 (Special Issue), December 2000, (Proceedings of International Symposium on Engineering Geology, Hydrogeology, and Natural Disaster *with Emphasis on Asia 28-30 Sept. 1999, Kathmandu, Nepal)*	1000.00
10.	Journal of Nepal Geological Society, Vol. 21, June 2000,	300.00
11.	Journal of Nepal Geological Society, Vol. 20 (Special Issue), (Abstract Volume of Symposium, September 1999),	500.00
12.	Journal of Nepal Geological Society, Vol. 19, 1999…….	300.00
13.	Journal of Nepal Geological Society, Vol. 18, (Special Issue) 1998, (Proceedings of Second Nepal Geological Congress, 1995)	500.00
14.	Journal of Nepal Geological Society, Vol. 17, 1997	300.00
15.	Journal of Nepal Geological Society, Vol. 16 (Special Issue), 1997, (Abstract Volume of Second Nepal Geological Congress)	300.00
16.	Journal of Nepal Geological Society, Vol. 15, 1997	300.00
17.	Journal of Nepal Geological Society, Vol. 14, (Special Issue), 1996, (Proceedings of First Nepal Geological Congress, 1995)	300.00
18.	Journal of Nepal Geological Society, Vol. 13, 1996,	300.00
19.	Journal of Nepal Geological Society, Vol. 12 (Special Issue), 1995 (Abstract Volume of First Nepal Geological Congress, 1995)	300.00
20.	Journal of Nepal Geological Society, Vol. 11 (Special Issue), 1995, (Proceedings of 9th Himalaya – Karakoram –Tibet Workshop, 1994)	300.00
21.	Journal of Nepal Geological Society, Vol. 10, (Special Issue), 1994, (Abstract of 9th Himalaya – Karakoram –Tibet Workshop, 1994)	500.00
22.	Journal of Nepal Geological Society, Vol. 9, 1993,	300.00
23.	Journal of Nepal Geological Society, Vol. 8, 1992,	300.00
24.	Journal of Nepal Geological Society, Vol. 7, 1991,	300.00
25.	Journal of Nepal Geological Society, Vol. 7, (Special Issue), 1991,	300.00
26.	Journal of Nepal Geological Society, Vol. 6, 1989	300.00
27.	Journal of Nepal Geological Society, Vol. 5, No. 1, 1988	300.00
28.	Journal of Nepal Geological Society, Vol. 4 No. 1 & 2, 1987,	300.00
29.	Journal of Nepal Geological Society, Vol. 4, (Special Issue), 1994*	300.00
30.	Journal of Nepal Geological Society, Vol. 3, No 1 & 2 1985,	300.00
31.	Journal of Nepal Geological Society, Vol. 2 No. 2 1983,	300.00
32.	Journal of Nepal Geological Society, Vol. 2 (Special Issue), 1982*,	300.00
33.	Journal of Nepal Geological Society, Vol. 2, No. 1, 1981,	300.00
34.	Journals of Nepal Geological Society, Vol. 1, No. 2, 1981*,	300.00
35.	Journal of Nepal Geological Society, Vol. 1, No. 1, 1981*,	300.00

***** Out of prints (only xerox copy available on request and advance payment)

++ The Price of Journal quoted above does not include the postal charges and bank collection charges.

NEPAL GEOLOGICAL SOCIETY

12th EXECUTIVE COMMITTEE

September 2004 – August 2007

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CONTENTS

NGS News

As in the past, the Nepal Geological Society (NGS) in collaboration with the Disaster Management Section, Ministry of Home Affairs; Department of Water-Induced Disaster Prevention, HMG; Department of Mines and Geology; UNDP-Nepal; and NSET-Nepal observed the **International Strategy for Disaster Reduction (ISDR)-Day** by organising a one-day National Meeting cum Workshop on 22 October 2003 in the Conference Hall of the Tourism Board, Bhrikutimandap, Exhibition Road, Kathmandu. The Seminar was inaugurated by Professor Dr Govind Prasad Sharma, Vice-Chancellor, Tribhuvan University and chaired by Mr Nanda Ram Sthapit, Director General, Department of Mines and Geology. Participants from different national and international organisations took part in the Meeting and various technical papers were presented in the Workshop.

The Nepal Geological Society successfully organised the **Fourth Nepal Geological Congress** on 9–11 April 2004 in the conference hall of the Himalaya Hotel, Lalitpur, Nepal. The conference was inaugurated by Chief Guest, Professor Dr Govind Prasad Sharma, Vice-Chancellor, Tribhuvan University, and chaired by Mr Nanda Ram Sthapit, Director General, Department of Mines and Geology (DMG). More than 100 national and international participants took part in the conference. Forty-one technical and four keynote papers were presented in four different sessions of the Congress.

Similarly, the Nepal Geological Society in collaboration with the Ministry of Home Affairs, HMG Nepal; Department of Mines and Geology; Department of Water-Induced Disaster Prevention; UNDP-Nepal; NSET-Nepal; and ActionAid Nepal organised a one-day seminar on **International Strategy for Disaster Reduction (ISDR)-Day** on 13 October 2004 in the conference hall of the Tourism Board, Bhrikutimandap, Exhibition Road, Kathmandu. The Seminar was inaugurated by Mr Thakur Prasad Sharma, Honourable State Minister, Ministry of Water Resources, and chaired by Mr Shital Babu Regmi, Director General, Department of Water-Induced Disaster Prevention, HMG Nepal. The participants from different national and international organisations took part in the Meeting cum Seminar. Twelve technical papers were presented in three different technical sessions.

The Nepal Geological Society successfully organised a one-day Seminar cum Workshop on **Geological Controls of Arsenic Contamination of Groundwater in the Terai Region of Nepal** on 25 January 2005 in the Conference Hall of the Park Village Resort, Budhanilkanth, Kathmandu. The Workshop was sponsored by the Environmental Office for South Asia, American Embassy and the South Asia Arsenic Project, US Geological Survey. The programme was inaugurated by Mr Deepak Gyanwali, Ex-Minister for Water Resources and Academician, RONAST, and chaired by Dr Ramesh M. Tuladhar, President of the Nepal Geological Society. Before the inauguration, Dr Tuladhar delivered his warm welcome speech. Similarly, Ms. Katherine Koch, Head, the Environmental Office for South Asia, US State Department, also addressed the conference. More than 120 national and international scientists took part in the Seminar. There were altogether three sessions in the Workshop. The First Technical Session was chaired and moderated by Mr Deepak Gyanwali. Two technical papers were presented in this Session. The Second Technical Session was chaired and moderated by Professor Dr Krishna Manandhar, Member Secretary of Royal Nepal Academy of Science and Technology (RONAST). Six papers were presented in this Session. The Third Technical Session was devoted to discussions and conclusions, and was chaired by Mr Pratap S. Tater, Immediate Past President of the Nepal Geological Society. At the end of the programme, Mr Jay Raj Ghimire, Treasurer of the Nepal Geological Society, offered the vote of thanks to all the participants and guests.

The Nepal Geological Society is going to organise the **Fifth Asian Regional Conference on Engineering Geology for Major Infrastructure Development and Natural Hazards Mitigation** on 28–30 September 2005 in collaboration with the International Association for Engineering Geology and the Environment (IAEG), and Asian Regional Groups of IAEG in Kathmandu, Nepal. The First Circular of this conference was published on 31 July 2003 and the Second Circular was published on 3 January 2005.

24th GENERAL BODY MEETING OF NEPAL GEOLOGICAL SOCIETY

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g]kfn ef}ulek ;dfhs**]rf}a};f}flif{s** ;fwf/0f ;ef @)^) efb|!# ut]-tbg';f/ #) cu:6 @))#_ sf lbg ;dfhsf cWolf >L k|tfk l;+x tft]sf] cWolftfdf sf7df8f}+ng}rf}l:yt vfgL tyf eªue{ljefusf] d]86f/Lod xndf ;'DkGg ePsf] lyof].pQm cj;/df ;j{k|yd ;dfhsf cWolf >L tft]n] ;DkGg{;xefuL ;b:ox?nfO{ clejfbg ug{x]Fb}:jfut efif0f k|t't ug{ePsf] lyof]. pQm cj;/df pxfF]g]kfn ef}ulek ;dfhn]ut Ps jiff{df u/]sf dVo–dVo sfo{qmdx?/ ca cfpb]F lbgx?df ;+fngsf nflu ;dfhn] to u/]sf ef}L sfo{qmdx?af/] ;H+fKt k|sfz kfb}{cf^gf] dGtJo JoSt ug{ePsf] lyof]. ttkZrft\o; ;dfhsf dxf;lrj >L /fh]b|k|;fb vgfnn] ;dfhsf] jflif{s k|tj]bg k|t't ug{eof]. pQm cj;/df ljutdf g]kfn ef}ulek ;dfhn] ;+fng u/]sf tyf eljiodf ;+fng ul/g] sfo{qmdx?sf] lj:t[t ljj/0f lbg'sf ;fy} cfpb]F] 22 October 2003 df ISDR-Day / 9 to 11 April 2004 df cfof]hgf ul/g] **Fourth Nepal Geological Congress** af/]lj:t[t 5nkmn eof]. ;fy} ;dodf pxfF]xfn;Dd g]kfn ef}ulek ;dfhsf];b:o ;ªVof %!^ / P;f];o6 ;b:o ;ªVof @* u/L hDdf %$$ ePsf] s'/f ;a}nfO{hfgsf/L u/fpg'ePsf] lyof]. o; kl5 sfo{qmdnfO{cufl8 a9fpg]qmddf pQm ;dfhsf sf]ffWolf 8f= tf/flglw e§/f0n];dfhsf] ut cf= j= @)%(÷)^) sf] cfo–Joo ljj/0f k|t't ug{sf ;fy} n]vf k/LIf0fsf]ljj/0f ;d]t k|t't ug{ePsf] lyof].

25th GENERAL BODY MEETING OF NEPAL GEOLOGICAL SOCIETY

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We Wish a Grand Success

To

Fifth Asian Regional Conference

On

Engineering Geology for Major Infrastructure Development and

Natural Hazards Mitigation!

BUTWAL POWER COMPANY LIMITED (BPC)

Field of Activities:	Build, own and operate hydropower plants by maximising use of local capability and institution building
Accomplishments:	Tinau - 1 MW, Andhikhola - 5.1MW,
	Jhimruk - 12MW
Some Activities:	
Project Development	Khimti Hydropower Project (60 MW) through involvement as sponsor and party to engineering design, project management, training and technology transfer and other support services
	Environment and community development services and various other consulting services i.e. feasibility studies, model studies, geotechnical studies etc. through its Hydro consult Department
Operation & Management	Andhikhola and Jhimruk Power Plants
Rural Electrification	Syangja, Palpa and Pyuthan districts

Address: Kumaripati, Lalitpur, P.O. Box: 11728, Tel: 5538404, 5535595, Fax: 5527901
Email: service@hydroconsult.com.np

Auditor's Financial Report (FY 2059/060)

3rd Bhadra 2061

The Members
Nepal Geological Society
Kathmandu.

Gentlemen,

I have audited the attached Receipt and Payment Account for the year ended 32nd Srawan 2061 and reports as follows:

1. I have got all the information and explanations which are required for the purpose of audit.
2. Proper books as required are maintained according to Company's Law.
3. The attached Receipt and Payment Account and Income and Expenditure Account are drawn properly up in accordance with records which are made available to me.
4. According to the information given to me the attached Income and Expenditure Accounts prepared for the year ended 32nd Srawan 2061 exhibit true and fair view.

Babu Raja Bajracharya
Registered Auditor

NEPAL GEOLOGICAL SOCIETY
RECEIPT AND PAYMENT ACCOUNT
For the year ended 32nd Srawan 2060

RECEIPT	AMOUNT	PAYMENT	AMOUNT
To Bank	2,929,303.23	By Advertisement	14,355.00
To Contribution	59,600.00	By Audit Fee	5,000.00
To Advertisement	5,000.00	By Tax on Interest	1,611.57
To Interest Received	28,138.03	By Tax on Interest ($19.33)	1,439.69
To Interest Received ($146.81)	10,935.88	By Advance	4,000.00
To Geo Map Sale	18,650.00	By Hospitality	101,455.00
To Life Membership Fee	29,175.00	By Stationery	23,313.00
To Membership Fee	16,350.00	By Photo Film	1,645.00
To Associate Members. Fee	100.00	By Printing	264,485.00
To Journal Sale	19,195.00	By Postage	12,682.00
To Journal Subscription	2,900.00	By Photocopy	8,479.00
To Miscellaneous Income	4,800.00	By Transportation	4,861.00
To Registration Fee	7,550.00	By Telephone	22,492.00
		By Remuneration / Salary	31,315.00
		By Rent	26,000.00
		By Miscellaneous Expenses	6,050.00
		By Furniture	7,050.00
		By Map Purchase	17,200.00
		By Membership Fee	30,418.00
		By Balance :	
		• Nepal Bank (Current), Bhotahiti	9,949.68
		• Nepal Bank (Fixed)	37,000.00
		• Nepal Bank (Saving)	11,776.03
		• Nebil Bank (Saving)	183,797.25
		• Nabil Bank (Fixed)	29,000.00
		• Nabil Bank $ a/c 23,607.44	1,758,618.21
		• Agri. Dev. Bank (Saving)	383,947.87
		• Agri. Dev. Bank (Fixed)	55,000.00
		By Misc. Loss (Diff Exchange Rate on $)	78,150.64
	3,131,697.14		3,131,697.14

Note : US$ 1 = NRs. 74.49

Treasurer	General Secretary	President	Auditor
Dr. T.N. Bhattarai	Rajendra Khanal	Pratap Singh Tater	Babu Raja Bajracharya

NEPAL GEOLOGICAL SOCIETY
INCOME AND EXPENDITURE ACCOUNT
For the year ended 32nd Srawan 2060

EXPENDITURE	AMOUNT	INCOME	AMOUNT
To Advance	4,000.00	By Advertisement	5,000.00
To Advertisement	14,355.00	By Contribution	59,600.00
To Audit Fee	5,000.00	By Interest Received	28,138.03
To Furniture	7,950.00	By Interest Received ($141.81)	10,935.88
To Hospitality	101,455.00	By Journal Sales	19,195.00
To Map Purchase	17,200.00	By Journal Subscription	2,900.00
To Membership Fee	30,418.00	By L.M. Fee	29,175.00
To Miscellaneous Expenses	6,050.00	By Asso. Membership Fee	100.00
To Photocopy	8,479.00	By Membership Fee	16,350.00
To Photo Film	1,645.00	By Geo Map Sale	18,050.00
To Postage	12,682.00	By Registration	7,650.00
To Printing & Press	264,485.00	By Misc. Income	4,800.00
To Remuneration	31,315.00	By Income Over Expenditure	382,157.55
To Rent	26,000.00		
To Stationery	23,313.00		
To Tax on Interest	1,611.57		
To Tax on Interest ($19.33)	1,439.89		
To Telephone	22,492.00		
To Transportation	4,661.00		
	584,551.46		584,551.46

Note : US$ 1 = NRs. 74.49

Treasurer	General Secretary	President	Auditor
Dr. T.N. Bhattarai	Rajendra Khanal	Pratap Singh Tater	Babu Raja Bajracharya

NEPAL GEOLOGICAL SOCIETY

RECEIPT AND PAYMENT ACCOUNT

For the year ended 32nd Srawan 2061

RECEIPT	AMOUNT	PAYMENT	AMOUNT
To Bank	2,468,989.04	By Advance	5,000.00
To Advertisement	7,500.00	By Audit Fee	5,000.00
To Contribution	136,000.00	By Advertisement	21,887.50
To 4th Cong Participation	182,730.00	By Bank Charge	850.00
To Donation	205,000.00	By Catering Service	25,625.00
To Interest received	14,906.93	By Communication	14,882.00
To Interest received ($70.87)	5,289.74	By Draft Commission	350.00
To Journal Sale	1,200.00	By Hospitality	262,724.00
To Journal Subscription	450.00	By Miscellaneous	12,295.00
To Membership fee	1,950.00	By Map Purchase	800.00
To Life Membership fee	4,150.00	By Printing & Stationary	180,856.00
To Map Sale	400.00	By Photo/film	3,005.00
To Miscellaneous Income	14,026.50	By Photocopy	18,242.00
To Off Print	7,325.00	By Postage	2,343.00
To Registration	88,128.00	By Fuel	1,106.00
		By Refreshment	9,554.00
		By Remuneration	15,740.00
		By Rent	36,000.00
		By Repair and Maintenance	5,100.00
		By Seminar Bag	27,900.00
		By Transportation	4,730.00
		By Tax on interest	1,044.20
		By Tax on interest ($10.63)	793.42
		By Balance	
		-- Nabil Bank (Saving)	181,511.52
		-- Nabil Bank (Fixed)	29,000.00
		-- Nabil Bank ($23667.68)	1,766,555.64
		-- Nepal Bank (Current)	9,949.68
		-- Nepal Bank (Saving)	11,776.03
		-- Nepal Bank (Fixed)	37,000.00
		-- Agri. Dev. Bank (Saving)	394,966.33
To Misc. Profit (Diff. In Exchange Rate on $)	3,541.11	-- Agri. Dev. Bank (Fixed)	55,000.00
	3,141,586.32		**3,141,586.32**

Note : US$ 1 = NRs. 74.64

Treasurer	General Secretary	President	Auditor
Dr. T.N. Bhattarai	Rajendra Khanal	Pratap Singh Tater	Babu Raja Bajracharya

NEPAL GEOLOGICAL SOCIETY

INCOME AND EXPENDITURE ACCOUNT

For the year ended 32nd Srawan 2061

EXPENDITURE	AMOUNT	INCOME	AMOUNT
To Advance	5,000.00	By Advertisement	7,500.00
To Audit Fee	5,000.00	By Contribution	136,000.00
To Advertisement	21,887.50	By 4th Cong. participation	182,730.00
To Bank Charge	850.00	By Donation	205,000.00
To Catering Service	25,625.00	By Interest received	14,906.93
To Communication	14,882.00	By Interest received ($70.87)	5,289.74
To Draft Commission	350.00	By Journal Sale	1,200.00
To Hospitality	262,724.00	By Journal Subscription	450.00
To Miscellaneous Exp.	12,295.00	By Membership fee	1,950.00
To Map Purchase	800.00	By Life Membership fee	4,150.00
To Printing & Stationary	180,856.00	By Map Sale	400.00
To Photo/film	3,005.00	By Miscellaneous Income	14,026.50
To Photocopy	18,242.00	By Off. Print	7,325.00
To Postage	2,343.00	By Registration	88,128.00
To Fuel	1,106.00		
To Refreshment	9,554.00		
To Remuneration	15,740.00		
To Rent	36,000.00		
To Repair and Maintenance	5,100.00		
To Seminar Bag	27,900.00		
To Transportation	4,730.00		
To Tax on interest	1,044.20		
To Tax on interest ($10.63)	793.42		
To Excess of income over expenditure	13,229.05		
	669,056.17		**669,056.17**

Note : US$ 1 = NRs. 74.64

Treasurer	General Secretary	President	Auditor
Dr. T.N. Bhattarai	Rajendra Khanal	Pratap Singh Tater	Babu Raja Bajracharya

Speech by Dr Ramesh Man Tuladhar, President Elect of 12th Executive Committee of Nepal Geological Society during the Office Handover Programme, 20 August 2004

Mr Chairman and President of Nepal Geological Society;
Chief Guest, Mr Mahendra Nath Aryal,
Secretary, Ministry of Water Resources;
Respected past presidents of Nepal Geological Society;
Distinguished Fellow Members of Nepal Geological Society;
Distinguished Guests, Ladies and Gentlemen:

Namaste!

First of all, I would personally like to express sincere gratitude to all the distinguished Fellow Members of the Nepal Geological Society for entrusting me to be the 12th President of the Nepal Geological Society.

Just a few minutes ago the Office of Executive Committee of the Nepal Geological Society was handed over to our team, the 12th Executive Committee of the Nepal Geological Society. Now onwards, an immense responsibility lies on our shoulders towards enhancing the activities of the Nepal Geological Society. Distinguished Fellow Members, it is indeed an honour on behalf of the 12th Executive Committee and on my own to express our sincere appreciation and gratitude for contribution and support from all to the Nepal Geological Society. I thank Mr Pratap Singh Tater, in particular, for his generous logistics and Vice President, Mr Govind Sharma Pokharel, for arranging financial sponsor in conducting various activities of the Nepal Geological Society.

Considering the performance of the last two activities of the Nepal Geological Society, namely the Fourth Nepal Geological Congress and the Election of the 12th Executive Committee, it delivers a message that there is much understanding and maturity in terms of professional dedication amongst distinguished Fellow Members. I have every hope that this tempo continues in the future too.

On behalf of the 12th Executive Committee, I do not want to make lots of commitments but we would like to simply assure distinguished Fellow Members that we would continue the activities of the Nepal Geological Society guided by the glorious path established by our predecessors. I would like to mention some anticipated major activities. They are:

- Talk programme related to geosciences,
- National and international seminars and workshops on relevant topics of geosciences,
- Celebration of **ISDR-Day**
- Publication of **NGS** Journals and Bulletins
- Participation in various relevant seminars and workshops
- Development of relationship with international geoscientific institutions, and
- Awarding honorary memberships to distinguished geoscientists.

Beside these, perhaps the time has now been demanding for the introduction of some additional activities remaining within the frame of the **NGS** Constitution and the available resources. For instance, a low level of geoscientific awareness is evident from the problems faced in the infrastructural development, such as the Mugling–Narayanghat Road, where the difficulties are rooted in the geological factors. Consequently, some of the potential areas for additional activities that could contribute towards the development of our Himalayan Kingdom could be the following:

- Awareness raising on geosciences (from the layman- to technical level),
- Research on national problems related to the geosciences

For this, all the distinguished Fellow Members are requested to kindly provide us with their valued suggestions through any convenient medium.

It was clear from the discussions during the 25 General Body Meeting this afternoon that many important jobs supposed to be done through Subcommittees could not progress much as yet due to several reasons. In this regards, how to activate the Subcommittees and how to improve the performance of Subcommittees are vital question before us.

Finally, may I on behalf of the12th Executive Committee and my own take this opportunity to sincerely request all distinguished Fellow Members to kindly support us by providing your valued suggestions in coming days for the betterment of our geosciences profession.

Thank You.

Speech by Mr L. N. Rimal, General Secretary Elect of Nepal Geological Society, during the Office Handover Programme

Mr Chairman,
Respected Chief Guest,
Distinguished Guests,
Dear Fellow Members of the Society,
Ladies and Gentlemen:

On behalf of the Nepal Geological Society, I am privileged to thank you all the distinguished guests in this Triennial Meeting cum Office Handover Ceremony of the Nepal Geological Society.

I am very much grateful to our respectable Chief Guest Mr Mahendra Nath Aryal, Secretary, Ministry of Water Resources for sparing his valuable time to inaugurate this Meeting cum Office Handover Ceremony this evening. I also extend my sincere thanks to Chairman, Mr Pratap Singh Tater for chairing the programme.

The Nepal Geological Society would also like to extend its sincere gratitude to all the high officials of His Majesty's Government of Nepal, distinguished guests, journalists, various consulting firms and business groups for kindly accepting our invitation to be with us in this programme.

I also extend my sincere thanks to all the members of the Nepal Geological Society for their continued cooperation and support in organising today's programme.

We offer our sincere apologies for any inconveniences that may have arisen during the organisation of this programme.

Once again, thank you, thank you all.

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Best Wishes to NCC on its 25th year of foundation!

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NATIONAL MEETING CUM SEMINAR ON THE OCCASION OF INTERNATIONAL STRATEGY FOR DISASTER REDUCTION (ISDR)-Day 2003

On the occasion of International Strategy for Disaster Reduction (ISDR)-Day 2003, the Nepal Geological Society in collaboration with the Disaster Management Section, Ministry of Home Affairs; Department of Water-Induced Disaster Prevention, HMG; Department of Mines and Geology; UNDP, Nepal; and NEST-Nepal had organised a one-day National Meeting cum Seminar on **"Living with Risk"** on 22 October 2003 in the Seminar Hall of the Tourism Board, Bhrikutimandap, Exhibition Road, Kathmandu.

The seminar was inaugurated by Honourable Chief Guest, Professor Dr Govind Prasad Sharma, Vice-Chancellor, TU, and it was chaired by Mr N. R. Sthapit, Director General, Department of Mines and Geology. At the beginning of inauguration programme, Mr P. S Tater, President of NGS, delivered a welcome speech. After inauguration, Mr R. K Aryal, Coordinator, NGS-ISDR Council, highlighted the aim of the Seminar. In this Meeting, Mr S. B. Regmi, Director General, DWIDP, HMG and Mr Barun Shrestha, Member NEST-Nepal also delivered their speeches about their respective department's contribution in disaster management. At the end of the inaugural session, Mr Som Nath Sapkota, Member of ISDR Council, offered the vote of thanks to the guest, participants and all other helping organisations. The inaugural programme was followed by a technical session in which various working papers were presented. The abstracts of the papers are presented below.

Best Wishes and
Hearty Felicitations

on

the Auspicious Occasion

of

Happy New Year
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Welcome Speech by Mr P. S. Tater, President, Nepal Geological Society

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Speech by Professor Dr Govind Prasad Sharma, Chief Guest, on the occasion of ISDR-Day 2003

Mr Chairman,
President of the Nepal Geological Society,
Ladies and Gentlemen,

It is my proud privilege to inaugurate this workshop on "Living with Risks" and address this august gathering.

For the opportunity provided to me I would like to thank the organising committee. I am indeed happy to learn that the Nepal Geological Society had successfully observed the IDNDR-day in the past by organising several awareness-raising programmes to school teachers, media person and different communities. It has also published awareness-raising posters, pamphlets, and books. Thus the concept of IDNDR has been instrumental in transferring the emphasis from relief and rescue to preparedness.

Based on this, the UN has established the International Strategy for Disaster Reduction (ISDR) as a global framework for action with a view to enable all societies to work together with their respective technology and local wisdom in order to reduce human, economic, and social losses.

We know that Nepal is a disaster-prone country. Owing to rugged topography, steep slopes, variable climatic conditions, complex geological structures with active tectonic process and continued seismic activity, this country is prone to various types of natural calamities. These hazards vary from snow avalanches and glacier lake outburst flood in the Higher Himalayas to fire and flood in the rest of the country. Landslides and earthquakes are also frequent. All these are causing extensive damage to national economy and heavy losses of lives and property every year.

In view of the frequency and perennial nature of disasters in Nepal, the seriousness of the impact of calamity on its social and economic development is not less than that of any other disaster-prone country. Actually speaking, we are seriously affected by every kind of disaster and the people of this part of world are living with great risks. These natural calamities have profound impacts on environment and development of the country.

That is why this year's UN theme of ISDR "Living with Risk" is quite relevant for us.

It is also a hard fact that the risk due to these natural processes cannot be totally checked but minimised by adopting appropriate scientific and local technology and by raising the awareness of the people.

I am very much hopeful that this gathering of geoscientists, planners and community representatives will update our understanding of the issues and come up with a feasible strategy to mitigate the disaster-related effects on the people and property of Nepal.

It is wonderful that the professional societies like the Nepal Geological Society had contributed significantly to the task of awareness rising in the country through the IDNDR decade. I am glad to note the Society has again taken up the responsibilities to disseminate the idea and concept of ISDR in the country. I wish every success to the Society in the future endeavour.

Thank you for your kind attention.

Address by Mr Shital Babu Regmi, Director General, Department of Water-Induced Disaster Prevention, on the occasion of ISDR-Day 2003

Mr Chairman;

Respected Chief Guest Professor Dr Govind Pd. Sharma, Vice-Chancellor, Tribhuvan University;

President of Nepal Geological Society;

Distinguished Representatives from various organisations;

Distinguished Guests and Participants;

Ladies and Gentlemen:

On the occasion of this International Strategy for Disaster Reduction (ISDR)-Day 2003, I would like to extend my warmest greetings and appreciation to the Nepal Geological Society for taking the key initiative to organise this National Meeting cum Seminar in collaboration with the Ministry of Home, UNDP-Nepal, Department of Water-Induced Disaster Prevention and NSET-Nepal, as has been done in previous years.

In a country like ours where disasters, particularly water-induced, are recurrent phenomena primarily due to torrential rains in the mountain or hill slopes and river catchments, a few hundred of the unlucky and unwary among our follow country men are swept away by landslides, debris flows and floods every year. Such calamities inflict great physical, economic, and psychological stresses upon our people.

On account of Nepal's specific physiographic and hydro-meteorological characteristics, the risk of water-induced disaster is almost ubiquitous. Lack of resources, technical know-how and warning and forecasting systems combined with the low level of awareness of the people aggravates the vulnerability of the rural people to various disasters. Therefore the primary and crucial task confronting us is to identify on a countrywide basis over the time-frame proposed by the Water Resources strategy – Nepal 2002, areas of the country prone to risk. For this, hazard assessment and vulnerability assessment must go side-by-side with management assessment. For this the institutional capabilities of the partner organisations involved in disaster reduction must be strengthened with the utmost priority as directed by the strategy.

In this connection, I believe the ongoing National Water Plan will provide a clear plan of action for all relevant institutions concerned with the mitigation of water-induced disasters with adequate resource backing, so that our efforts at disaster reduction can cascade down through the local governmental and non-governmental entities to the grass roots. After all, it is the communities at risk, who must be made aware, organised and enabled to adapt to an acceptable level of risk without jeopardising their physical and economic livelihood. Hence, this ISDR-Day theme "Living with Risk" is very significance.

Finally, disaster reduction being an extremely complex issue cutting across many sectors and sections of society, may this day be a reminder to us all to renew our pledge for making even more concerted efforts at institutionalising a comprehensive disaster reduction strategy from the national to the community level. For this, the Department of Water-Induced Disaster Prevention is committed to collaborate with all partners and stakeholders to the best of its ability.

I once more express my heartfelt appreciation to the Nepal Geological Society and other collaborating partners including the distinguished guests and participants for contributing to the success of this very significant day.

Thank you.

Best wishes to NGS on entering its 25 years of foundation

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Speech by Chairman Mr N. R. Sthapit, Director General, Department of Mines and Geology

Honourable Chief Guest Professor Dr Govind Pd. Sharma, Vice Chancellor, Tribhuvan University;
Mr Shital Babu Regmi, Director General,
Department of Water-Induced Disaster Prevention;
Mr P. S. Tater, President of NGS;
Mr Barun Prasad Shrestha, NSET-Nepal;
Distinguished Guests;
Ladies and Gentlemen:

It is great pleasure for me to be invited to this august gathering and chair the Inaugural Session of this Meeting cum Seminar on "Living with Risk" organised by the Nepal Geological Society to observe the ISDR- Day 2003. I would like the thank the organisers for giving me this opportunity.

We observed the IDNDR days since the UN General Assembly declared 1990–1999 as the International Decade for Natural Disaster Reduction (IDNDR) by organising meetings, seminars, workshops, and trainings. Based on the lessons learnt from IDNDR, the UN has established the International Strategy for Disaster Reduction (ISDR) in order to reduce human, economic, and social losses. According to the UN proposal, from 2001 onwards we are observing the ISDR-Day every year with a view to increase public awareness about various types of disaster and their consequences and also improve the knowledge on the causes of natural disasters and their proper mitigation. In this prospective the Department of Mines and Geology (DMG) is providing basic geoscientific information including data on earthquake events to engineers, planners, decision-makers for sustainable infrastructure development planning, land use planning, disaster mitigation and environmental protection. Proper applications of available geoscientific information will definitely contribute to meet the goal of ISDR.

All of us are aware that Nepal is a disaster-prone country. Natural disasters like landslides, debris flows and soil erosion are common in the hilly regions; floods in the plain areas; snow avalanches and GLOFs in the Higher Himalayan region and earthquake in the whole country. By now, the concept of IDNDR has been able to transfer the emphasis from relief and rescue works to preparedness and mitigation. Disaster mitigation is an immense task for us. However, pre-disaster activities could be more cost-effective than post-disaster activities in the long run. Therefore, integration of disaster reduction measures into development programmes is necessary. In this regard various governmental and non-government organisations are engaged in disaster mitigation and foreign or international agencies are providing with valuable supports for disaster prevention, mitigation, and management works. Combined efforts of all these organisations are very much helpful to the government in preparedness, mitigation, relief, and rescue operations in the country.

The DMG has been engaged not only in geological mapping, mineral exploration and promotion of mineral based industries, but also doing engineering and environmental geological investigations in urban areas (municipalities), geo-hazard mapping and continuous recording and monitoring of earthquake events with 21 seismic stations located in different parts of the country. In this way the Department is contributing towards integration of geological information and knowledge for sustainable development planning and disaster mitigation.

Engineering and environmental geological mapping of urban areas (municipalities) has provided geoscientific data and information such as rock or soil characteristics, ground condition, expansion and development of residential or new settlement areas, selection of waste disposal sites, identification of hazard-prone areas, source of construction materials, and source and quality of drinking water, to the engineers, planners, environmentalist and decision-makers. Networking and operation of National Seismological Centre is one of the activities of the DMG to acquire real-time data on earthquake, compile and interpret all these seismological data for developing earthquake catalogue and for better understanding of the tectonics and geological structure in the Himalaya with a goal to know in advance about frequency of recurrences and forecast the possible future major earthquakes.

The Nepal Geological Society has contributed a lot in the development and propagation of IDNDR ideals and ISDR goal in Nepal especially in raising awareness on mitigation possibilities of the natural disaster. The DMG is always ready to cooperate the NGS in its geoscientific programme including the ISDR activities.

Once again, thanks to the organisers for inviting me in this programme to chair the Inaugural Session. It was an opportunity to share my views and experiences with you all. I am sure that the follow- up Technical Session will be quite helpful to disseminate the geoscientific knowledge and experiences among the participants and that ultimately help the country for further works on disaster mitigation and environmental protection.

I wish for a grand success of the Seminar.

Thank you.

ABSTRACTS OF PAPERS PRESENTED IN THE SEMINAR ON INTERNATIONAL STRATEGY FOR DISASTER REDUCTION (ISDR)-DAY 2003

Ramche Landslide of 15th August 2003

S. N. Sapkota, B. Kafle, L. Mitchell, and D. Sherstad
Department of Mines and Geology, Lainchaur, Kathmandu, Nepal

On the night of 15 August a landslide hit an army camp located at Ramche VDC Ward number 9 of the Rasuwa District killing 20 army personnel including the commander of the camp. The landslide was caused by the blockage of a small stream flowing few tens of metres from the camp. The flow of the stream was blocked for sometime and afterwards it spilled over resulting in a big avalanche of mud and boulders sweeping away the army camp, a primary school, and a suspension bridge downhill. Then, the stream started flowing along its new course for some hours and later on it maintained its original path.

This landslide is an example that even a very small stream can cause considerable damage of life and property. Hence, it is very important to conduct a land use planning before establishing a settlement.

Implementation of building code at municipal level: experience of NSET working with LSM

R. Guragain, B. Pandey, A. M. Dixit, and S. B. Pradhananga
NSET-Nepal, Nayabaneshwor, Kathmandu, Nepal

Nepal has a long history of recurring earthquakes, which have caused extensive deaths and damages. The extent of damage is high because a majority of buildings in Nepal are built without considering seismic safety requirements. More than 98% of the buildings in the country are owner-built.

Towards promoting safer building construction, the National Society for Earthquake Technology- Nepal (NSET) has been playing an instrumental role in advocating for seismic safety, especially the issue related to general and specific seismic safety requirements including those in owner- built buildings. Through a partnership approach with various organisations and stakeholders, NSET is supporting public awareness programmes, training programmes at community levels, integration of seismic resistance into the process of new construction, increasing the safety of school children and school buildings, improving seismic performance of existing buildings, and in increasing the expert's knowledge of the earthquake phenomenon, vulnerability, consequences, and mitigation techniques.

NSET, in collaboration with National Forum for Earthquake Safety (NFES), is supporting the Lalitpur Sub-Metropolis (LSM) by providing weekly orientation programmes to house owners. It is also assisting LSM by providing technical assistance for preparing guidelines for building permit process. This was done following LSM's decision to implement provisions of the Nepal National Building Code, which includes earthquake resistant design and construction practices. The municipal by-law henceforth requires all new buildings constructed after 16 January 2003 to comply with the building code. This regulation was declared on behalf of LSM by the Honourable Deputy Prime Minister in a meeting dedicated to the Earthquake Safety Day 2003.

This paper analyses the existing construction mechanisms and trends, and describes the approach, tools and effectiveness of the initiatives taken for increasing seismic safety of the owner-built buildings in Nepal. Lessons learnt from the implementation of building code at municipal level are discussed in the paper.

Water-induced hazard mapping in the Rupandehi District of west Nepal

[1, 2]Megh Raj Dhital, [3]Rajendra Shrestha, [4]Motilal Ghimire,
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[3]Butwal Power Company Limited, Kumaripati, Lalitpur, Nepal
[4]Central Department of Geography, Tribhuvan University, Kirtipur, Kathmandu, Nepal

An integrated water-induced hazard map was prepared for the Rupandehi District (latitudes 27° 30" N –27° 47' 15"N and longitudes 83° 12' 27" E –83° 38' 53" E). The map is targeted to assist the local inhabitants in planning, mitigating, and avoiding the water-induced dangers.

Most of the study area lies in the Terai Plain consisting of fluvial gravel, sand, silt, and clay of several hundred metres in thickness. The mountainous northern part is represented by the Siwaliks. Colluvial and residual soils are sporadically found on hill slopes.

The Tinau megafan is a fundamental landform of the study area. It predominates over all other processes operating in the Terai. It lies almost in the centre of the Terai, and it is pushing the Rohini River to the east and the Kanchan River to the west. A maximum width of the fan is18 km, its length is 14 km, and average slope is less than 2 degrees. The megafan zone together with other coalescing fans is divided into the upper fan (Bhabhar zone), middle fan (Upper Terai), lower fan (Middle Terai), transitional zone of fan and alluvium, and three sub zones of alluvial plain together with the floodplain.

The Dano River is a bifurcation of the Tinau River towards the west and it confluences with the Kanchan River at Suryapura. Further downstream (i.e., beyond the study area) the Dano River again joins with the Tianu River. The Tinau River and the Dano River have a rather straight course within the megafan zone, and then they exhibit meandering course similar to other major river systems of the area. There are also some smaller fans formed by the Kanchan River and the Rohini River. Their length ranges up to about 8 km.

Floodplain analysis of the Tinau and Dano Rivers was carried out using one-dimensional numerical model HEC-RAS and ArcView GIS. A flood hazard map was prepared based on the extreme water flow condition, and the flood hazard was classified into four classes depending on the depth of water. A landslide hazard map was prepared using the GIS based bivariate statistical techniques. A debris flow hazard map was prepared on the basis of aerial photo and satellite imagery interpretation, field observations, and GIS analysis of digital data. A river undercutting hazard map was prepared from the digital data and field observations.

An integrated water-induced hazard map of the Rupandehi District was generated by combining all the above hazard maps. It shows landslide, debris flow, and gully erosion hazard in the upper reaches of the Rohini, Tinau, Dano, and Kanchan Rivers as well as flood and bank undercutting hazard in their lower reaches. The map also depicts the main rescue routes to nearby service centres and shelters.

Earthquake-resistant building design and construction in Nepal

Jiba Raj Pokharel
Institute of Engineering, Pulchowk, Lalitpur

Nepal has been experiencing a major earthquake every 75 to 100 years and a mild one every 50 years. Accordingly, seismologists have been predicting an earthquake of a major intensity in Nepal in the future. The earthquake is likely to claim the life of 40,000 people in the Kathmandu Valley alone according to a study. The loss is going to be more if the rest of the country is accounted for. There are two ways by which this loss can be averted to a great extent and they are the initiation of new earthquake-resistant building design and construction. Moreover, the existing buildings also need to be retrofitted. This presentation focuses on these two major aspects in the context of a major earthquake in Nepal.

Fourth Nepal Geological Congress, 9–11 April 2004

The Nepal Geological Society successfully organised a the **Fourth Nepal Geological Congress** on 9–11 April 2004 in the Conference Hall of the Himalaya Hotel, Lalitpur, Nepal. The Congress had five different themes related to geology of the Himalaya. The Congress was inaugurated by Chief Guest, Professor Dr Govind Prasad Sharma, Vice-Chancellor, Tribhuvan University and chaired by Mr Nanda Ram Sthapit, Director General, Department of Mines and Geology. At the beginning of the inaugural programme, Mr P. S. Tater, President of NGS, delivered a warm welcome speech. After inauguration, Dr Ramesh M. Tuladhar, Convener of the Fourth Nepal Geological Congress, highlighted the main perspectives and themes of the Congress. The inaugural session was followed by five technical sessions in two days. About 100 national and international participants took part in the congress. A total of 41 technical papers and 4 keynote papers were presented.

The Nepal Geological Society express its gratitude to Mr Peter Gafner, Project Manager, Fichtner JV, Phedikuna, Lamjung; as well as Mr Ernst Schmid and Mr L. Rueck, Project Managers, DDC-JV, Udipur, Lamjung for their financial support to the Fourth Nepal Geological Congress.

Welcome speech by Mr P. S. Tater, President, Nepal Geological Society

Respected Chairperson Mr Nanda Ram Sthapit, DG, DMG;
Chief Guest Hon. Professor Dr Govind Prasad Sharma,
Vice-Chancellor, Tribhuvan University;
Distinguished guest and participants;
Respected honourable members; ex-presidents; and
Fellow Members of NGS;
Media Personnel;
Ladies and Gentlemen:

It is indeed a matter of great pride for the Nepal Geological Society and all the members of Nepalese geoscientific community to welcome you all in this inaugural session of The Fourth Nepal Geological Congress. The prominent geoscientists, and practitioners working in a variety of areas of geology in the Himalayas, are gathered here today and for the next two days, to share their findings of the scientific studies and research. We will discuss to improve our knowledge and understanding of the geology, geological processes, and the challenges in order that we could translate this knowledge and understanding into our actions to improve the life and health of the Himalayan region and the people living in it.

The Himalayas provide tremendous potential as well as challenges to the people living here. They have intrigued and also fascinated the mankind since, they came into existence. To this day, geology and geological setting of the Himalayas are themselves a great fascination and a challenge for all the nature-loving mankind, and this is more so to the geoscientists. As a result, this region has attracted people from all walks of life from all over the world, including the geoscientists, and great geological researchers. It is very important that the knowledge is put together and discussed, so that the fruits of those great works are carried over ultimately to the benefit of all the people. We see that this kind of scientific event is an effective and important forum for such purposes.

Mr Chairperson,

In this Congress, we shall be presenting and discussing the results of our research works under the five broad themes related to geology of the Himalayas. I am quite sure that we all are going to have a great time in these two days while we present our results and discuss on them for further advancements. Dr R. M. Tuladhar will give the details of this Fourth Nepal Geological Congress and its theme.

Mr Chairperson,

The Nepal Geological Society was established in 1980, and since then, this Society has been working very actively for the advancement of this science in Nepal, making it relevant to the economic development activities in the country. Scientific conferences like this one, and seminars and meetings on various contemporary and important geological topics, lectures, awareness programmes, and dissemination of research results through regular publication of scientific journals and bulletins have been the main activities of this Society. We believe that our activities have helped not only the geosciences and the geoscientists, but also the people in this country, in this Himalayan region, and other mountainous regions of the world.

The Nepal Geological Society organised the First Nepal Geological Congress in 1995. The impressive and encouraging participation of a large number of geoscientists in that congress, not only from Nepal, but also from other neighbouring countries of this region as well as other regions of the world, was the key to inspire us. This kind of support and participation has continued in every earlier congresses and seminars organised by the NGS and even in this Fourth Congress, we have so many prominent geoscientists from various countries as our distinguished guests. As always, you have accepted our invitation and we are honoured by your presence with great humility. We appreciate this from the very core of our hearts and we understand fully that your active support and participation have been the secret of the success in our journey to this Fourth Nepal Geological Congress. We are fully confident that such cooperation will continue in the future too.

The Nepal Geological Society has a tradition to honour of its member and geoscientist who has contribution in the field of Geology of the Himalayas.

In this connection, the NGS board of Directors of 2000 had decided to honour Professor Dr K. S. Valdiya of India and Dr Patrick Le Forte of France to be the honorary members of the Society for their contribution in the Himalayan geology. Therefore, today in this august gathering we will have a privilege to honour Professor Dr K. S. Valdiya and Dr Patrick Le Forte by offering the honorary membership plaque and awards as a token of love from the NGS. Professor Dr K. S. Valdiya is here today with us. Professor, I welcome you on behalf of the NGS and all its members.

I here by welcome every one of you in this important scientific event, and invite you to share your knowledge and experience with each other, for the ultimate benefit of the people of this region, and the world. I welcome you all once again, and wish you all a very productive and interesting conference as well as a comfortable stay despite the problems country is facing.

Thank you.

Speech by Dr Ramesh Man Tuladhar, Convener, Fourth Nepal Geological Congress, 9-11 April 2004, Kathmandu, Nepal

Respected Chairman, Mr Nanda Ram Sthapit;
DG, Department of Mines and Geology;
Honourable Chief Guest Dr. Govind Pd. Sharma, Vice-Chancellor, TU;
Distinguished Delegates;
Distinguished Guests;
Friends from Media;
Fellow Colleagues;
Friends, Ladies, and Gentlemen:

On behalf of the Organising Committee and on my own, may I take this opportunity to express my sincere gratitude and warm welcome to the distinguished guests and honourable participants to this august gathering of the Fourth Nepal Geological Congress.

We are indeed honoured by the presence of the Distinguished Foreign Guests here in this Congress despite the abnormal security situation in the country.

The Nepal Geological Society is a non-profit, non-governmental, and non-political, professional scientific society solely devoted towards enhancing geoscientific activities in the national and international level. It was founded twenty-four years ago, in 1980. In other words we are to celebrate its silver jubilee next year. It would not be an exaggeration to mention that Nepal Geological Society has by now established its image in the national and international arena as an important geoscientific organisation. To its credit, may be listed a number of national and international seminars, symposia, conferences, and congresses. The continuous publication of scientific journals without a break since its inception has been its pride that reflects the devotion, dedication, and determination of all our national geoscientific community. Today we all are assembled here again to share our geoscientific knowledge amongst us.

Mr Chairman, our world is challenged by so many kinds of natural hazards induced by water, tectonics, geology, and topography. They are directly governed by geoscientific factors resulting in floods, landslides, soil erosion, earthquake. In recent years, recurrent landslides and debris flows along the highways in Nepal have become an acute problem. Just a few days ago the Mugling-Narayanghat road, one of the most important National Highways of Nepal was again blocked due to slope failures and debris flows even in this dry season. One may imagine what may happen during the torrential monsoon season. Geoscientists have to play a major role in the mitigation of all such natural hazards. Their role, particularly in this Himalayan terrain, as a partner for the sustainable development of water resources, urbanisation, infrastructural development, hydropower development, and natural disaster reduction has become indispensable.

Mr Chairman, the organisation of this Congress was initiated ten months ago following the decision of the 11th Executive Committee of the Nepal Geological Society to keep up the continuity in organising the Geological Congress as its regular activity. However, there was no any financial support then except for a long list of potential sponsors. The courageous fellow colleagues of the Society had exerted great efforts to find a series of small donors to meet the Congress expenses and we are here to share our experience in this forum.

Although this is an international event, due to the abnormal security situation some foreign delegates have declined to come to this Himalayan kingdom which otherwise was a peaceful land. This Congress nevertheless provides an ample opportunity to expose and to share valuable experiences of inland geoscientists. This Fourth Nepal Geological Congress was organised with the following perspectives,

1. To demonstrate the importance of geoscientific exploration for making the engineering structures sustainable;
2. To help create awareness amongst the planners and policy makers;
3. To provide a forum for discussions for the effective and sustainable use of water resources both, the surface as well as groundwater, which are abundantly available in this region;
4. To share experiences of natural disaster mitigation; and
5. To create a conducive atmosphere to work together in a coordinated and collaborated manner towards the enhancement of geoscientific works.

With these perspectives, the themes of this Fourth Nepal Geological Congress have been confined to:

- Regional Geology and Tectonics,
- Natural Resources,
- Engineering and Environmental Geology,
- Natural Disaster and Public Awareness, and
- Geological Risk Management.

We all know that natural phenomena such as earthquake, soil erosion, flood, and landslide, take place without respecting political boundaries. These processes occurring at one end of the Himalayas have a great bearing on the other.

Therefore, we need more interaction, cooperation, and collaboration for the further development of geoscientific works and to face the challenges that lie ahead of us.

Mr Chairman, over 150 geoscientists responded enthusiastically to our first announcement of this Fourth Nepal Geological Congress from over a dozen countries. Finally, we have now over 100 participants from over half a dozen countries. Many participants were seeking financial support but we were unable to do so. Many more participants declined to come to Nepal obviously due to security reasons. A total of 55 papers were accepted for presentation in the Congress. Besides, four keynote papers will also be presented. These papers will be presented in five technical sessions in two days. Day 1 will have only one Technical Session while Day 2 will have four technical sessions running in two parallel sessions at a time. Day 3 is for field Excursion, which is yet to be decided depending upon the number of interested participants. By the end of this year, the Proceedings of this Congress will be published.

This event, the Fourth Nepal Geological Congress, would not have materialised without the warm support and cooperation from many individuals and institutions including the unfailing support and encouragement from many relevant governmental and non-governmental organisations, engineering consulting companies, and members of the Nepal Geological Society. We are highly indebted to them all.

I am aware that there have been many shortfalls during the preparation of the Congress that may have caused inconvenience to many participants. As a Convener, I am fully responsible for all those shortfalls for which I sincerely apologise.

Last, but not least, once again I extend my warmest welcome to all the honourable participants to this Fourth Nepal Geological Congress. I wish you all a fruitful deliberation in the Congress and a pleasant and enjoyable stay in this ancient city of Kathmandu.

Thank you very much, honourable participants and guests

Speech by Chief Guest Professor Dr Govind Prasad Sharma, Vice-Chancellor, Tribhuvan University

Mr Chairman;
Honorary Members of Nepal Geological Society;
President, Nepal Geological Society;
Distinguished Foreign and Nepalese guests;
Ladies and Gentlemen:

We have a similar task to perform: the exploration of a human body and the earth. It is a great privilege and honour for me to be invited to this august gathering of the Fourth Nepal Geological Congress giving me the opportunity to inaugurate this important international meeting of the Society.

I congratulate the members of the Nepal Geological Society for organising this international event and being able to bring together scientists from SAARC region and other countries in order to develop the geological research of the Himalayas and other regions of the world.

I am also happy to know that the Society has established a tradition of international cooperation and joint efforts in uncovering the geological mysteries of the Himalayas, in exploring and developing the mineral and water resources of the region, and in establishing the geological hazards to the environment.

Distinguished Geoscientists,

In as country like ours, with young and fragile geological structures, the geoscientific research plays an important role in reducing the loss of life and property due to natural disasters such as earthquake, flood, landslide, soil erosion, glacier lake outburst, and environmental degradation due to the development of basic infrastructure and exploitation of groundwater resources.

On the other hand, it is also a fact that the knowledge of earth, on which entire civilisation rests, is crucial for the development of the society. Geosciences help in understanding the behaviour and character of earth's surface and also it's interior. It helps in harvesting mineral resources, ground water, petroleum and basic raw materials for the development to the society. The research works, and proper methodology and proper utilisation of these resources ultimately help in reducing the poverty of the region.

Hence, in this Congress, I believe the scientific papers presented and discussed in the technical sessions will provide encouragement and guidelines to all Nepalese geoscientists and help to plan their future geoscientific works for national development with new thoughts and theories.

I am also happy to learn that the Nepal Geological Society is also honouring two of the eminent geo-scientists with the honorary membership of the Society: Professor Dr. K. S. Valdiya, a Bhatnagar Research Fellow at the Jawaharlal Nehru Centre for Academic Scientific research, Bangalore, India, and Dr. Patrick Le Fort, a prominent geoscientist from France, for their remarkable contributions towards the development of geosciences in the Himalayas. I take this opportunity to congratulate both of these eminent geoscientists.

Hearty welcome to the participants of
Fifth Asian Regional Conference,
28-30 September 2005

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I hope that the brief stay of our foreign guests in Kathmandu will be comfortable and pleasant. I thank the organisers once again for giving this opportunity to be with you and share some of my feelings. I wish a grand success of the Congress.

Thank you very much for your kind attention.

Speech by Chairman Mr N. R. Sthapit, Director General, Department of Mines and Geology

Honourable Chief Guest, Professor Dr Govind Pd. Sharma;
Vice-Chancellor, Tribhuvan University;
Mr P. S. Tater, President, Nepal Geological Society;
Higher Dignitaries from the governmental and other organisations;
Distinguished Guests and Participants;
Members of Nepal Geological Society;
Ladies and Gentlemen:

It is a great privilege and honour for me to be invited to this august gathering and Chair the Inaugural Ceremony of the Fourth Nepal Geological Congress organised by the Nepal Geological Society. I sincerely would like to thank to the organisers for giving me this opportunity.

I know that the Nepal Geological Society is highly devoted to expand and upgrade the geological knowledge by geoscientific researches in the country since its establishment in 1980. The Society is providing better forum for closer interactions, sharing of experiences and ideas among geoscientists of the world by organising seminars, symposia, workshops, and talk programmes, and disseminating the research findings through its regular scientific publications like the Journal of Nepal geological Society. It is commendable that the Journal of NGS has worldwide circulation.

In this developing world the role of geoscientists is increasing day by day and their activities are diversified from traditional mineral exploration and development to engineering and environmental geology, land use and infrastructural development, hazard mitigation, and environmental protection. Nowadays, geoscientific knowledge is applied in various developmental works; from planning, and designing to the implementation stage.

Different studies show that Nepal is rich in natural resources like minerals and water. Systematic exploration, identification, efficient and timely exploitation and proper utilisation of these vast resources definitely help to upgrade national economy and sustainable development of the nation. The Department of Mines and Geology is the sole government organisation responsible for conducting (1) geoscientific survey and research, (2) mineral exploration, development, and promotion of mineral based industries, (3) engineering and environmental geological studies of fast-growing urban areas, (4) seismotectonic studies and earthquake monitoring (5) petroleum and natural gas exploration, development and promotion, and (6) mines administration and regulation. Geoscientific investigations carried out by the DMG are successful to prove a numbers of mineral deposits in the country. Mineral industries like Himal Cement, Hetaunda Cement, Uayapur Cement, Jogimara Agrilime, Kharidhunga Orind Magnesite, small-scale coal mines, stone quarries are some to the significant outcomes. Phulchoki iron, Ganesh Himal Zn – Pb and number of limestone deposits suitable for cement and allied industries are yet to be exploited. Investment to exploit vast amount of limestone, dolomite, industrial minerals, construction and dimension stones, gemstones, and exploration and development of petroleum are highly rewarding in Nepal.

Geological mapping and publication of geological maps are other major activities of the Department. Preparation and publication of engineering and environment geological maps of urban areas are in the process. All these maps are highly useful for mineral exploration, infrastructure development and land use planning, disaster management, and environmental protection. With the help of seismological network with 21 seismic stations and regular monitoring of earthquakes, we were able to publish seismic hazard maps and micro seismic epicentre maps of the Nepal Himalaya and adjacent regions. These maps are helpful for geological hazard and risk management.

The Department of Mines and Geology is closely working with the NGS. Many research works carried out by the Department are published in the Journal of NGS. I would like to assure you that the Department will continue its cooperation and support to the Society in all geoscientific research and developmental activities.

I am delighted to know that about 100 geoscientists from 7 countries are participating to deliberate their research findings in the Congress. I am sure, the Technical Sessions to be followed will provide an ample opportunity to the Nepalese geoscientists to interact and share their views with the international geoscientific community. Let us hope the results of the Congress will provide some guidelines for future research and development in the Nepal Himalaya.

I wish for a grand success of the congress.

Thank you for your attention.

NATIONAL MEETING CUM SEMINAR ON THE OCCASION OF INTERNATIONAL STRATEGY FOR DISASTER REDUCTION (ISDR)-Day 2004

On the Occasion of International Strategy for Disaster Reduction Day (ISDR) 2004. Nepal Geological Society (NGS) in collaboration with Ministry of Home, DMG, UNDP, DWIDP, NEST-Nepal and ActionAid Nepal organised a one day National Meeting cum Seminar on **"Learning from Today's Disasters for Tomorrow's Hazards"** on 13th October 2004 in the Seminar hall of the Tourism Board, Bhrikutimandap, Kathmandu.

The Seminar was inaugurated by Chief Guest Mr Thakur Prasad Sharma, Honourable Sate Minister, Ministry of Water Resources and chaired by Mr Sital Babu Regmi, Director General DWIDP, HMG Nepal. At the outset of the Inaugural Session, Dr Ramesh Man Tuladhar, President of the NGS, delivered a warm welcome speech. In this session Mr R. K Aryal, Co-ordinator NGS-ISDR Council highlighted the aim of the workshop, and Mr S. B. Pradhananga, President of NSET-Nepal, delivered a speech about contribution of NSET in disaster management. At the end of the inaugural session Mr Lila Nath Rimal, General Secretary of the NGS, offered a vote of thanks to the guests, participants and all other helping organisations. The inaugural programme was followed by three technical sessions in which 13 technical papers were presented. The sessions were chaired by Professor Dr Cees van Westen and Dr Prakash Chandra Adhikary. The abstracts of the papers are presented below

Welcome Speech by Dr Ramesh Man Tuladhar, President, Nepal Geological Society

Respected Chairman, Mr Shital Babu Regmi, DG, DWIDP;
Honourable Chief Guest, Mr Thakur Prasad Sharma,
State Minister, Ministry of Water Resources;
Professor Dr Cees van Westen, ITC, The Netherlands;
Mr S. B Pradhananga, President of NSET;
Distinguished Fellow Members of Nepal Geological Society;
Distinguished Guests;
Friends from Media;
Fellow Colleagues;
Ladies and Gentlemen:

On behalf of the Organising Committee and on my own, May I take this opportunity to express my sincere gratitude and warm welcome to the distinguished guests and honourable participants to this august gathering of the One–Day Seminar on **"Learning from Today's Disaster for Tomorrow's Hazards" on the auspicious occasion of ISDR-Day 2004.**

I am indeed, honoured by the gracious presence of Honourable Chief Guest Mr Thakur Prasad Sharma, State Minister, Ministry of Water Resources and other distinguished guests among us, the geoscientific community.

The Nepal Geological Society had observed IDNDR (1990–2000) by performing various awareness-raising programmes for school teacher, media persons, community people and also published awareness-raising posters, pamphlets and journals. Based on lessons learnt from the IDNDR, the United Nations has established the International Strategy for Disaster Reduction (ISDR) as a global framework in bringing forth action plans towards minimising the loss of lives and properties. It involves a conceptual shift from emphasis on disaster responses to risk management. Four goals of the ISDR are:

1. To increase public awareness about disaster reduction,
2. To obtain commitment from public authorities,
3. To stimulate interdisciplinary and inter-sectoral participation, and
4. To improve scientific knowledge of the causes of disasters and consequences of the impact of natural hazards.

It would not be an exaggeration to mention that the Nepal Geological Society has by now established its image in the national and international arena as an important geoscientific organisation. To its credit, may be listed a number of national and international seminars, symposia, conferences and congresses including "the Meriteous Certificate for the Disaster Prevention for 1998". The continuous observation of IDNDR-Day followed by ISDR-Day by organising awareness-raising programmes without a break since its inception has been its pride that reflects the devotion, dedication, and determination of all our national geoscientific community towards achieving the goal. Today we all are assembled here again to share our geoscientific knowledge amongst us.

Mr Chairman, our world is challenged by so many kinds of natural hazards induced by water, tectonics, geology, and topography resulting in floods, landslides, soil erosion, and earthquakes. In recent years, recurrent landslides and debris flows along the highways in Nepal have become an acute problem. Just a few days ago six persons were killed and a dozen are missing due to a rock fall cum slope failure along the Palpa–Butwal Road. Geoscientists have to play a major role in the mitigation of all such natural hazards. Their role in this Himalayan terrain as a partner for sustainable development of water resources, urbanisation, infrastructural development, hydropower development, and natural disaster reduction has become indispensable.

We all know that natural phenomena such as earthquakes, soil erosion, floods, and landslides take place without respecting political boundaries. These processes occurring at one end of the Himalayas have a great bearing on the other. Therefore, we need more interaction, cooperation, and collaboration for the further development of geoscientific works and to face the challenges.

Mr Chairman, over 100 geoscientists are gathered here to share their deliberations during the Technical Sessions to be followed by this Inaugural Sessions.

I am aware that there have been many shortfalls during the quick preparation of this One-Day Seminar that may have caused inconveniences to many distinguished participants. As President of Nepal Geological Society, I am fully responsible for all those shortfalls for which I sincerely apologise.

Last, but not least, once again I extend my warmest welcome to all the honourable members of the society to this One–Day Seminar. I wish you all a fruitful deliberation in the Seminar.

Thank you very much, honourable participants and guests.

Speech by Mr R. K. Aryal, Coordinator, ISDR Committee

Respected Chairman Mr S. B. Regmi,
Director General, DWIDP;
Honourable Chief Guest Mr Thakur Prasad Sharma,
Minister, ministry of Water Resources;
Mr M. R. Pandey, Hon. Member, Nepal Geological Society;
Respected senior officials of His Majesty's Govt. of Nepal;
Dear fellow members of Nepal Geological Society;
Distinguished Guests; Ladies and Gentlemen:

It is my great pleasure to welcome you all to this National Meeting cum Seminar organised by the Nepal Geological Society on the occasion of ISDR-Day 2004. This meeting, and the seminar that is to follow after the Inaugural Session, are being organised in close co-operation with the Department of Disaster Management, Home Ministry, HMG; Department of Mines and Geology, UNDP-Nepal, Department of Water-Induced Disaster Prevention, HMG, Nepal; NSET Nepal, and ActionAid Nepal. It forms a part of the national effort for observing ISDR day in Nepal.

We are grateful to all the distinguished guest and participants for kindly accepting our invitation to attend this programme. We are particularly thankful to the Chief Guest Mr Thakur Prasad Sharma, Honourable Minister of Water Resources for being with us this morning.

We all of us know that the Nepal Geological Society had observed the IDNDR Day throughout the Decade of 1990-1999 and has also observed the ISDR DAY since 2002. Continuing this tradition, it is observing the ISDR Day, 2004, today. The Society observes this day to take stock of the disaster risk reduction initiatives implemented throughout the year in the country, congratulate each other on successes, learnt lessons from each other's experience and to renew our zeal in the fields of disaster risk reduction. Such consistent endeavour of the NGS has received wide appreciation nationally and also internationally.

The International Strategy for Disaster Reduction has replaced the decade of IDNDR. The concept of IDNDR helped the country and the population to develop confidence in the field of mitigation and prevention, to make a shift from fatalism to active preparedness, foster a culture of prevention and community participation and also for the successful implementation of the risk reduction work. All these approaches have helped in fostering multi-sectoral and intra-disciplinary approach.

With these learnings from the past, the ISDR is being observed this year also under the UN theme "Learning from today's disaster for tomorrow's hazard". This theme is particularly very relevant to the countries like Nepal where the country is experiencing huge losses of life and property each year due to earthquakes, floods, landslides, soil erosion, and glacier lake outburst floods (GLOF).

To minimise the effect of these hazards we should learn from the past experience for future preparedness. We have enough scientific, administrative and technical knowledge and expertise in the country. The only task is to implement this knowledge in everyday practice as soon as possible to minimise the loss of life and property. We had some very good examples of sustainable land use and landslide prevention techniques that were implemented in Nepal. The need for today is to replicate this experience in other types of disaster. It certainly requires credible national action plan, programmes and then implement its support from different government and non-governmental organisations.

We should also be aware that any disaster risk reduction programme cannot be fully successful unless we involve the vulnerable communities. The mountain communities have their traditional wisdom that they used for coping with mountain hazards in the past and even today. This wisdom may still be applicable, especially for a sustainable effort. Hence, greater involvement of the communities, respecting their say more, will help in making the efforts sustainable and successful.

For the implementation of ISDR concepts and disaster risk reduction initiatives, as in the past, the NGS will always be working in close synergy with our collaboration partners: the Home Ministry, UNDP, ICIMOD, LWF, DWIDP, NSET, SCAEF, the consulting business, and several other governmental and non-governmental organisations. Without their kind help and understanding, we could not have achieved so much in the IDNDR decade. We thank all the collaborating partners for their constant help and support and expect same in the coming days. We are especially thankful to Ministry of Home Affairs for encouragement to observe today's programme.

As in the past, the Technical Sessions that will follow after this Inaugural Session will deliberate on various aspects of natural hazard mitigation and risk reduction. I do hope that the discussions and presentations will guide us to better ways of disaster risk reduction in the coming years.

Once again I extend a very warm welcome to you all and thank you very much.

Thank You.

Vote of thanks by Mr L. N. Rimal, General Secretary, Nepal Geological Society

Respected Chairman;
Honourable Chief Guest;
Distinguished Guests and Participants;
Respected Honorary Members of the Society,
Dear Fellow Members of the Society,
Ladies and Gentlemen:

On behalf of the Nepal Geological Society, I am privileged to thank all the distinguished guests and participants of this one-day seminar on "Learning from Today's Disasters for Tomorrow's Hazards".

I am very grateful to our Chief Guest Mr Thakur Prasad Sharma, the Honourable State Minister, Ministry of Water Resources, for sparing his valuable time in inaugurating the seminar with his inaugural speech to this programme. The Society would also like to express its gratitude to Mr Shital Babu Regmi, Director General, Department of Water-Induced Disaster Prevention, for chairing this inaugural session despite his busy schedule. The speech is highly appreciable in the context of raising awareness in the reduction and mitigation of the natural disaster.

The Society would like to extend its sincere gratitude to the Ministry of Home Affairs for its strong cooperation and support to observe the ISDR Day. The Society extends its sincere thanks to UNDP, Nepal, for its kind support and cooperation to organise the programme.

The Society is also very grateful to the Department of Mines and Geology for supporting it by providing all kinds of helps at times when needed. It would like to express sincere appreciation and acknowledgment to the Department.

I offer my thanks to the Department of Water-Induced Disaster Prevention for its strong cooperation and support in all the activities of the Nepal Geological Society.

I am sincerely thankful to the National Society for Earthquake Technology (NSET) Nepal for its collaboration and necessary helps it has provided in organising the programme.

I extend my sincere thanks to ActionAid Nepal and NFAD, Japan for their collaboration and financial help in organising the programme.

The Nepal Geological Society would also like to extend its gratitude to all the high officials of His Majesty's Government of Nepal, distinguished guests and Journalists for being with us in this ceremony.

I also offer my thanks to various governmental, national and international agencies, consulting firms, business groups as well as individuals for their kind support and cooperation in all the activities of the Society.

The organisation of today's Technical Sessions to be followed after this meeting would not have been possible without the valuable contributions of papers and presentation by the distinguished experts. The Nepal Geological Society extends its thanks to all the contributors and participants too.

A great deals of thanks go to all the members of the Nepal Geological Society for their continued cooperation and support in organising the programme.

Our sincere thanks are also due to the Tourism Board, Nepal, for providing this venue for the Seminar. We offer our apologies for inconveniences that may have arisen during the organisation of the programme.

Thank you all once again.

ABSTRACTS OF PAPERS PRESENTED IN THE SEMINAR ON INTERNATIONAL STRATEGY FOR DISASTER REDUCTION (ISDR)-DAY 2004

Implementation of building code: experience of Lalitpur Sub-Metropolis

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Nepal has a long history of recurring earthquakes, which have caused extensive deaths and damages. The extent of damage is high because a majority of buildings in Nepal are built without considering seismic safety requirements. More than 98% of the buildings in the country are owner-built.

The 1934 AD earthquake destroyed 20 per cent and damaged 40 per cent of the valley's building stock. However, a large earthquake today near the Kathmandu Valley – the cultural, political and economic heart of the country – would cause tremendously greater human tragedy, physical damage, cultural loss and economic crisis than was caused by past earthquakes. Towards promoting safer building construction, the National Society for Earthquake Technology- Nepal (NSET) has been playing an instrumental role in advocating for seismic safety, especially the issues related to general and specific seismic safety requirements including those in owner-built buildings. In the late 90s, it was estimated that if the level of shaking which occurred in 1934 occurs again in the Kathmandu Valley, it will cause 40,000 deaths and 95,000 injuries with 60% existing buildings to be damaged beyond repair.

Realising the fact, the Lalitpur Sub-Metropolis (LSM) has decided to implement the National Building Code since, 15 January, 2003. The LSM is the pioneer in implementing the building code among the 58 municipalities of Nepal. NSET is providing technical assistance for this endeavour upon the request of the LSM.

GIS for seismic building loss estimation in Lalitpur Sub-Metropolis area

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In order to be able to carry out a seismic building vulnerability assessment in the Lalitpur Sub-Metropolis area, in Kathmandu Nepal, a building survey was performed to collect information on the material and occupancy types of building in this area. The study area, with a size of 15.5 square kilometres was divided into 500 small clusters having homogeneous characteristics in terms of building occupancies and the predominant building information was collected from these clusters in percentages. After digitising and editing the available digital building footprint map, these percentage values were converted in the number of buildings per cluster. The vulnerability relation developed by NSET Nepal, an NGO working in Earthquake Vulnerability Reduction, was used and a series of GIS operations were performed to link this relation to the building types in the Lalitpur area. A Building damage estimation was carried out for three expected scenario earthquakes that were used in a JICA study in 2002. Two new earthquake hazard maps prepared by ITC M.Sc. students were also used to find out the damaged buildings in the Lalitpur area. For the different earthquake scenarios, the total number of damaged buildings were estimated to range from 1654 (6%) to 22293 (83%) in the worse case scenario, which corresponds to an 8 Magnitude earthquake located close to Kathmandu. The building loss estimation was in the same order as the one from the earlier study by JICA in 2002. However, the results are with more spatial detail, and are a basis for population loss estimation, and also setting up a system for building permits, which is one of the most important earthquake vulnerability reduction measures the Lalitpur Sub-Metropolis Office is advised to carry out.

Community-based approach for earthquake risk reduction: an experience of School Earthquake Safety Programme (SESP)

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An improvised vulnerability assessment of about 1100 buildings of public schools in the Kathmandu Valley, undertaken by the Kathmandu Valley Earthquake Risk Management Project (KVERMP), revealed that none complied with the requirements of the National Building Code. The school buildings have a variety of problems in terms of structural design, materials quality, construction procedures, and also the age. Opinions differed in terms of the possibility of improving seismic safety in public schools of Nepal: many opted for demolition and new construction. The National Society for Earthquake Technology – Nepal (NSET) opted for a comprehensive strategy that incorporated the concepts of:

- Incremental safety,
- Seismic retrofitting using locally available materials and skills,
- Community participation in safety improvement of public schools,
- Capacity building (Training of local craftsmen), and
- Awareness raising.

Accordingly, NSET started the School Earthquake Safety Program (SESP) in 1999, which demonstrated the technical, social, and cultural feasibility of structural intervention in existing public buildings for improving seismic performance. Since then, SESP has grown much in concept and contents, and is generally regarded as one of the most successful earthquake risk reduction programmes of Asia.

This paper describes the vulnerability of the schools, seismic intervention options, components of the retrofitting programme, benefit-cost comparison of mitigation actions, and lessons learnt from the programme implementation, and the benefit-cost ratio of seismic retrofitting of public school buildings. It is found that small, dispersed infrastructures like school buildings are better options as target of demonstration projects on mitigation. It also demonstrates how School Earthquake Safety Programme ultimately increases the seismic safety of the entire community.

Kathmandu Valley Earthquake Preparedness Initiative (KVEPI): a step in earthquake risk reduction

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National Society for Earthquake Technology-Nepal (NSET) is working for its mission to make all the communities of Nepal safer against earthquake by 2020. Earthquake risk reduction in a country like Nepal with a high seismic risk and low level of awareness is not an easy endeavour. Realising the fact that this mission cannot be achieved by NSET alone without active participation from other institutions, it has initiated to pursue support from other organisations to join the mission. The Nepal Red Cross Society (NRCS) is one of these institutions which have agreed to join the NSET mission of making the communities of Nepal safe from earthquakes. The NSET and NRCS have signed a Memorandum of Understanding to spread the earthquake risk reduction activities throughout the country mobilising the existing nation-wide networking of NRCS at all levels.

The Kathmandu Valley Earthquake Preparedness Initiatives (KVEPI) are being carried out as one of the joint efforts of NRCS and NSET. The KVEPI are formulated and implemented as a pilot programme in 10 wards of the five municipalities within the Kathmandu Valley. The KVEPI are being implemented in partnership with the concerned municipality, ward and the respective NRCS District and Subchapters. The main objectives of the KVEPI are:

- Disaster management capacity building of NRCS
- Disaster preparedness and response capacity of 10 wards of five municipalities in the Kathmandu Valley.
- Increase public awareness on earthquake safety and preparedness practices

The KVEPI were started from December 2003 and will be completed by March 2005. The paper briefs the project proceedings, activities planned, and current status including the achievements so far and their preliminary effects.

Earthquake disaster and monitoring

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Nepal witnessed many devastating earthquakes from the time immemorial. The historical earthquake dated back to 1255 AD with MM intensity of X (Chitrakar and Pandey 1986). It is said that one–third of the total population of the Kathmandu Valley had been killed by that earthquake. Similarly the earthquakes of 1408 AD, 1681 AD and 1810 AD had been reported to destroy many houses and temples with MM intensity of IX. The earthquake of 26 August, 1833 AD had been reported to kill 500 people destroying 4000 houses and injuring 172 people. The reported MM intensity ranges from IX-X in the Kathmandu Valley.

The great earthquake of 1934 AD is considered as the biggest earthquake of the 20th Century with epicentre in the eastern Nepal (Bhojpur) With MS 8.3 which rocked whole Nepal including northern India. This earthquake had killed about 16,000 people from Nepal and India. About 8,000 people lost their lives in Nepal (4,000 in the Kathmandu Valley alone). This earthquake brought a great economic loss as well. Some elderly people who are still alive consider it as nightmare. It is hard to imagine the impact of such an earthquake in the present situation where the population of Nepal is about 25 million (1.8 million in the Kathmandu Valley alone).

The importance of seismological studies in Nepal was strongly felt when the earthquake of 29 July, 1980 (Bajhang) of magnitude 6.5 hit the country in Far West Nepal devastating many buildings bringing a great economic loss to the country. Similarly, the earthquake of 20 August, 1988 A D with MS 6.6 hit Eastern Nepal and brought a death toll of 721 people injuring 6,445. About 80893 houses were destroyed and landslides were triggered at many places. The maximum intensity generated was VIII in the MM scale. Many places suffered liquefaction. The National Seismological Network is operating 21 short-period vertical seismic station, with two recording centres, one in Kathmandu and the next in Birendranagar, Surkhet.

The Kathmandu Valley consists of loose sediments like sand, clays and gravels, which may play a vital role for amplifying seismic waves by resonance effects. During 1985, DMG had carried out the micro tremor study of the Kathmandu Valley to study the different response of ground motion at different places. It is important to delineate the high risk zones. The seismic hazard map of Nepal produced by the Department of Mines and Geology shows peak ground horizontal acceleration contours within Nepal. Further microzonation of big settlement areas is needed to delineate areas of different risk zones.

What matters is what is hidden behind the cladding

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A 6.6 magnitude earthquake struck the Bam city on 26 December 2003 at 5:26 AM when people were still asleep. It killed 26,500. More than 50,000 people were injured and about 100,000 people remained homeless. It killed more than 11,000 school children out of 30,000 school children and made 6,000 orphans. The most disturbing fact is almost all of the casualty occurred in buildings that were less than 30 years old rather than old or ancient mud buildings. The major cause of loss of life and property was the building damage. All types of building structures including steel and RC framed construction suffered the destructive damage. This article presents forensic study of the building damage.

Engineering and environmental geological mapping around Bhairahawa–Lumbini area of Rupandehi District

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The widely uncontrolled and unplanned urbanisation, improper land use practices, and rapid growth or migration of the population in the fast-growing cities lead to irreversible damages to the environment. Despite efforts of the geoscientific community, it is not always realised by the public nor by the authorities, that anthropogenic hazard, as well as the harshest effects of natural disaster could have been avoided by proper designs and layouts, by taking into account the geological evidence from the very start of the urban planning process.

At present the Department of Mines and Geology (DMG) is preparing engineering and environmental geological maps of some of the fast-growing cities in the country for the potential users. In continuation, the Department carried out its geoscientific investigation around the Bhairahawa–Lumbini area for the preparation of engineering and environmental geological map in the last fiscal year. As most of the urban cities are developed over unconsolidated quaternary sediments, the study area is no exceptional. The investigated urban area are mainly characterised by a high exploitation rate of the geological resources and an increasing demand for use of available land. Such areas are found more vulnerable to environmental problems due to the excessive abstraction of groundwater, over-extraction of river sand or gravel, loss of fertile land, destruction of landscape as well as soil and water pollution. An integration of environment-related geoscientific information in rural or urban planning and infrastructure development is necessary to identify potential hazards or competitive use of land and to assess, minimise, and avoid adverse environmental impact.

As one of the aims of the DMG is to assist and ensure proper input of geological knowledge to environmental planning and management, the final engineering and environmental geological map will fully demonstrate or address the utility of the geo-information in urban or infrastructure planning, land development, environmental problem, mitigations of natural and anthropogenic hazard, and sustainable use of natural resources for the potential users. With this view, the DMG is endeavouring to bridge the gap amongst geoscientists, planners, and decision-makers for the healthy urbanisation in the country.

Sediment-related disasters in Nepal: challenges and issues

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Sediments–related disasters (SRD) are quite common in Nepal. But yet they are neither well defined nor clearly classified. In this presentation, SRD are defined as the natural movement of soil or rock mass mainly due to geotectonic processes and actions of water during monsoon, in particular. Four types of SRD are considered here, which are most common in Nepal. They are soil erosion, landslide, slope failure, and debris flow. In recent years, the debris flow phenomenon is gaining significant attention due to its frequent occurrences particularly along the hill road. A quick survey carried out along the Mugling–Narayanghat Road revealed 14 SRD sites of which 9 sites are affected by debris flows. Due to its sudden mass movement nature, the damages imparted by this phenomenon is much more than the others. Several illustrations are sited to demonstrate the extent of physical damages they can cause. Prevailing natural conditions are susceptible to SRD yet there is a lack of adequate policy to address the problems. Further, several natural as well as human–induced challenges exist. Many issues are involved, and they include disaster management policy, appropriate technology, community participation and socio-economic aspects and they point towards an urgent need for due consideration. An attempt is made to briefly review the situation of sediment–related disasters in Nepal.

The use of geoinformation for municipal risk management in Lalitpur Sub-Metropolis

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The aim of this paper is to present the first results of a research project entitled Strengthening Local Authorities in Risk Management (SLARIM). The main objective of this project is to develop a methodology for spatial information systems for municipalities, which will allow local authorities to evaluate the risk of natural disasters in their municipality, in order to implement strategies for vulnerability reduction. The project concentrates on medium-sized cities in developing countries, which do not yet utilise Geographic Information Systems in their urban planning, and which are threatened by natural hazards (such as earthquakes, flooding, landslides, and volcanoes). The methodology concentrates on the application of methods for hazard assessment, elements at risk mapping, vulnerability assessment, risk assessment, and the development of GIS-based risk scenarios for varying hazard scenarios and vulnerability reduction options, using structural and/or non-structural measures. The methods for risk assessment that are applied depend on the availability of existing data within the study area, and range from simple loss estimations based on historic information to more complex methods based on modelling. In the development of elements at risk, a database is prepared from high-resolution satellite imagery interpretation combined with extensive field observations using mobile GPS. Local communities and organisations are playing an important role in the collection of vulnerability information, and in the evaluation of social vulnerability and capacity. Although the methodology is primarily designed to assist municipalities in the decision-making regarding vulnerability reduction strategies, the resulting databases are designed in such a way that they can also be utilised for other municipal activities. Within the project a number of case study cities have been identified. This paper presents some of the results from the study in the Lalitpur city in Nepal for seismic risk management. The project is carried out by research staff, Ph.D. and M.Sc. researchers of various disciplines at ITC, in collaboration with other partners (such as ADPC, ICIMOD, NSET, and DMG) and linked to external research and capacity-building projects.

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Dolomite resources in Nepal and their uses

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INTRODUCTION

Dolomite is a carbonate rock of sedimentary origin. In general, both the dolomite and limestone occur together. In Nepal, dolomite was not a priority mineral for exploration in the past because of almost no existence of dolomite-based industries in the country. However, in many cases dolomite is recorded while exploring limestone for cement industries. A preliminary geological investigation was able to trace most of the carbonate units or bands as a whole and some dolomite bodies or bands in particular in the country.

DOLOMITE OCCURRENCE

Dolomite and limestone are the common rock types in the Lesser Himalayan region (Mahabharat Range). They are also recorded in some parts of the Higher Himalayan region as well as in the Tethys Sedimentary zone. During geological mapping, dolomite bodies are recorded almost throughout the country, from east to west. Dolomite is traced in association with limestone deposits in the Khotang, Dhankuta, Udayapur, Sindhuli, Dolakha, Kabhre, Kathmandu, Makwanpur, Dhading, Syangja, Baglung, Palpa, Gulmi, Arghakhanchi, Pyuthan, Dang, Sallyan, Rolpa, Rukum, Jajarkot, Surkhet, Dailekh, Jumla, Achham, Doti, Bajhang, Bajura, Baitadi, and Darchula districts. On the other hand, some limestone beds are already explored and proved as cement-grade quality. Based on some of these limestone deposits a few cement industries were established and a few others are in the pipeline. But, most of the dolomite prospects are not yet explored in detail and still we do not know their grade and quality to make proper industrial use. However, from preliminary geological mapping, it is very roughly estimated that over 5 billion tons (possible reserve) of dolomite occurs in Nepal. The Department of Mines and Geology is planning to explore these dolomite resources in the near future.

PHYSICAL AND CHEMICAL PROPERTIES

The chemical composition of dolomite is calcium magnesium carbonate Ca Mg $(CO_3)_2$ with minor impurities of silica, iron, and alumina. Its specific gravity and hardness are 2.87 and 3.5 - 4.00, respectively. Generally, it is light grey to dark grey in colour, however, pink, pinkish grey, brown to yellowish brownish grey varieties are also known from different parts of the country. Stromatolitic dolomite is common in the Dhading, Surkhet, Baitadi, Bajhang and Bajura area. The colour of dolomite varies according to the impurities present in it. Elephant-skin type of weathering is characteristic of dolomite and helps to distinguish the dolomite from the limestone. Only the powder of dolomite reacts with dilute hydrochloric acid (HCl). According to its composition, the dolomite is classified as siliceous dolomite, argillaceous dolomite, and stromatolitic dolomite.

USES

Depending upon the composition of dolomite, it can be divided into 10 categories**.** It can be used in many ways (more than 30 primary uses). Some of the important uses of dolomite are as follows (Table 1).

In Nepal, dolomite is an extremely important building or construction material and it is used as block stone, dimension stone, polished stone, and aggregate for concrete, road fillings and asphalting materials. So far only Nepal Lever Limited and Johnson and Nicholson Limited. Use dolomite as chemicals in a very limited amount.

Dolomite is also used to manufacture refractoriness, high-magnesium lime, special solar cement, dolomite clinker, and also flux for iron and steel industries, and ferroalloy industries.

It is one of the main sources of magnesia and carbon dioxide. Semicalcined dolomite is used in the preparation of magnesium oxychloride cement, magnesium oxysulphate cement, in producing magnesium and silica bricks.

Dolomite can be directly used in the agricultural field to neutralise acidity of the soil. It also helps to make up the loss of magnesia in the soil. It can be used in acid water treatment, However, it depends on the pH of the water to be treated.

Chemicals like MgO, $Mg(OH)_2$, $MgCO_3$ and $MgSO_4$ can be obtained from dolomite. $Mg(OH)_2$ is useful in preparing MgO and is used as plastic filler for fire retarding properties and making refractory materials. Magnesium carbonate is used on a small scale as filler in the paper, paint, rubber, varnish, and pharmaceutical industries.

The quality of dolomite depends on its chemical composition like MgO%. CaO%, SiO_2%, Al_2O_3%, Fe_2O_3%.

Table 1: Industrial use of dolomite

Industries	MgO%	CaO%	SiO_2%	Al_2O_3%	Fe_2O_3%
Iron and steel industries	18-20	>28	<2	<1	<1
Iron and steel refractories	>20	>30	<20	-	-
Fertiliser industries CaO + MgO (combined)	90	-	-	5%	-
Lime industries	28 - 48	52.75	-	-	-
Magnesium metal	40.50	58	-	-	0.8
Agriculture	28	35	-	-	-
Chemicals	21.07	30.4	1.6	0.24	0.45
Soral cement	>17	-	Trace	0.05	0.13
Filler extender	20	30	-	Very low	-

Source: N. R. Sthapit and R. K. Khadka, Department of Mines and Geology, Kathmandu, Nepal, unpublished report, 1996

Depending on these oxides (composition of dolomite), it can be used in various industries (Table 1).

RECOMMENDATION

A huge amount of dolomite is present in different parts of Nepal. A detailed exploration and industrial evaluation of these dolomite deposits have yet to be carried out. Therefore, a detailed investigation and evaluation of these valuable mineral resources in the country is warranted to make a multiple industrial use of them.

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An overview of Chandisthan Landslide, Lamjung District

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ABSTRACT

The landslide of the Chandisthan Village Development Committee (VDC) has been a big threat to the residents since a long time. The slide reactivated on the 9th of Shrawan 2060 B.S. after three days of continuous rainfall. Houses were damaged, the road towards Chame was completely blocked, and towers of the power supply as well as drinking water pipelines were severely affected.

The Saring and Belautibisauna landslides were found to be the most active ones within the Chandisthan VDC with the slopes ranging from 14 to 80 degrees. The landslide area consists of loose colluvium. Most of the area is covered by paddy fields with no proper drainage system. The landslides resulted from the reactivation of dormant slides due to the development of a high pore water pressure. However, terrain subsidence and development of tension cracks along the slopes have been formed, probably, also due to road opening through the toe of the old landslide mass. In case of a large earthquake, the unstable landslide mass of the slide area is likely to be reactivated.

Apart from constructing check dams, sidewalls and bioengineering system, the drainage system should be improved around the slide zones to divert the surface water from the landslide. About 8 km long new alternative alignment along the left bank of the Marsyangdi River up to Nyadi is recommended for the purpose of avoiding the frequent road blockage by the landslide and providing a continuous access to Chame.

INTRODUCTION

The present study area is located to the north of Besisahar (where the district headquarters are located) in the Lamjung District (Fig. 1). The Marsyangdi River, one of the main rivers of Nepal, flows almost north-south along the eastern border of the study area. The survey was conducted for a week from 15th of Mangsir 2060 B. S. The field survey was carried out using 1:25,000 scales topographic map enlarged from 1:50,000 scale topographical maps of 1960s. The 1:50,000 scale aerial photographs (Nos. 28-30) taken in 1979 were also utilised for mapping purpose.

The study was focused mainly around the landslide area of the Chandisthan Village Development Committee (VDC) especially in Wards 2, 4, 5, and 8. Ward No. 3 of Baglungpani was also investigated in some details. The landslide of Chandisthan is situated about 4 km north of Banisher. It has threatened the people living in the area and adversely affected the connecting road (the Bhanubhakta Acharya Marg) to Chame (in the Manang district) from Banisher. The road is still under construction.

BACKGROUND

The landslide has been affecting the residents of Chandisthan VDC for a long time. According to the local people, the landslide was initiated about 70 year ago and damaged the cultivatable land, houses and the main trail connecting the district headquarters. Some people migrated to other parts of the country, while many others relocated

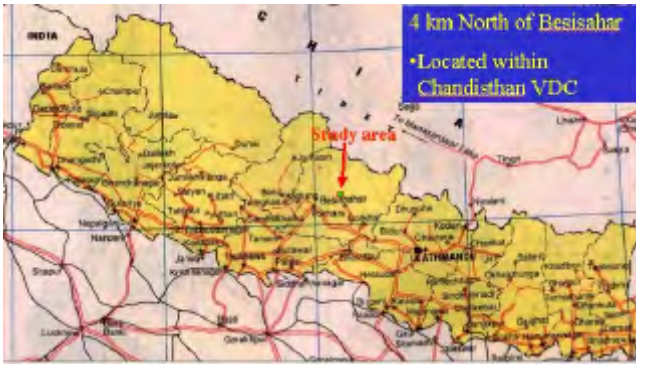
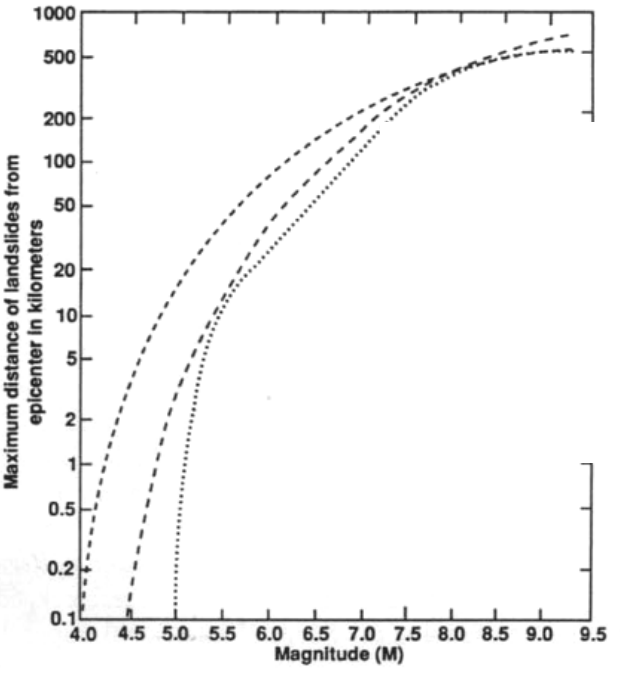


Fig. 1: Location map of the study area

their houses to relatively safer areas of the VDC due to the severe landslide problem.

On the 9th of Shrawan 2060 B.S. (25 July 2003) at 10 P.M. the slide began to move after 3 days of continuous rainfall. An earthquake magnitude of 5.9 was recorded by the National Seismological Centre of the Department of Geology and Mines in 2058 BS in the Gorkha areas, which may indicate that the slide was not caused by that earthquake. According to Keefer (1984), the maximum distance from the epicentre to the landslides as a function of the magnitude for three general landslide types is shown in Fig 2. Landslides involving loose, saturated, cohesion less soils on low to moderate slopes commonly occur as a result of earthquake-induced liquefaction. In the present case, the distance from earthquake epicentre landslide triggering to this landslide seems to be longer than the Keefer's relation of magnitude verses maximum distance. Therefore, it is not possible to relate here that the above magnitude of earthquake could have caused this type of landslide. Belautibisauna, a small village located on the banks of the Belautibisauna Khola (tributary of the Marsyangdi River) was affected by the debris (Fig. 3, 4) generated by the landslide. Two houses were buried, 4 houses were partially damaged, and three houses were partially affected. The road to Chame was blocked and some cracks were seen in the houses situated on the upper slopes of the Saring village. The electric towers and pipelines were severely affected. Owning to the fear of forthcoming disaster, most of the villages evacuated their houses.



Maximum distance to landslides from epicenter for earthquakes of different magnitudes. - - - -, disrupted falls and slides; – – –, bound for coherent slides; . . . ., bound for spreads and flows (Keefer 1984).

Fig. 2: Keefer's relation of Magnitude of the earthquake versus maximum distance to landslides

GEOLOGY

The study area consists of metamorphic rocks of the Kuncha Formation. There are thick colluvial deposits, Old River Terraces, Recent Alluvial Deposits and Recent Floodplain Deposits. The lineaments, (observed on the aerial photographs) of NW-SE, NE-NW, and E-W directions pass through the landslide vicinity.

Bedrock

The bedrock consists of green phyllites, white quartzite's, and garnetiferous schist's. Numerous quartz veins are seen aligned parallel to the schistosity planes. Sericite partings are common in the schist's. The Old River Terrace Deposits along the road section except for a few locations cover the bedrock. Rocks are dipping towards the northwest against the natural slope of the hill with dip amounts ranging from 10 to 50 degrees. It is a favourable geological condition for the stability of the slope. However, the rocks are intensely fractured and highly jointed resulting into an unfavourable condition for the stability of the slope. The rocks are also covered under the colluviums on gentle slopes. Steep slopes are presented in the upper part of the hills where the bedrock is exposed.

Colluvial Deposits

These deposits are distributed on gently (10^o–25^o) dipping slopes. Thick colluvial deposits are observed around the Saring village. It consists of angular rock fragments with a little amount of fines. The diameter of some boulders exceed 10 m and they were derived from the nearby rock (Fig. 4). The Colluvial deposits are up to 6 m thick and are involved in the slope movement processes. The deposits are relatively porous. This process helps to increase the pore water pressure creating an unfavourable situation for the stability of the slope. Consequently, most of the landslides are triggered within the colluvial deposits. As paddy fields, fields cover most of the area, the water inflates into and percolates through the soil.

LANDSLIDES AND SOIL EROSION

The slopes in the area vary from place to place. They range from 14 to 80 degrees. New landslides have developed within an old landslide area (Fig. 5). There are a number of recent scars. At least 7 major scars are observed within the Chandisthan area (Fig. 3). Among the 7 scars, a major scar

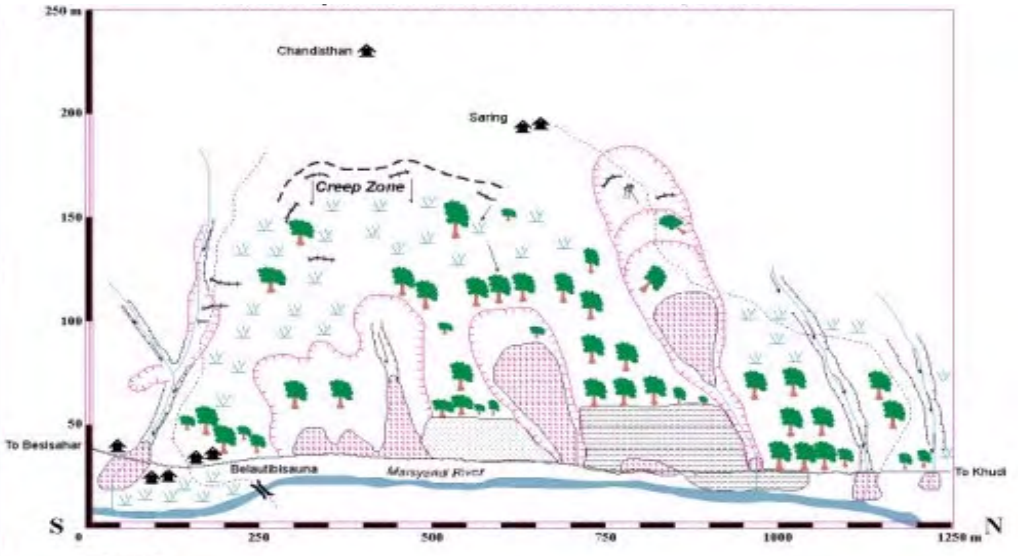


Fig. 3: Sketch map of the Chandisthan Landslide area

Fig. 4: Belautibisauna Landslide with large colluvial boulders

Fig. 5: Chandisthan village with the Saring and Belautibisauna Landslides

of the most active slide is located below the Saring village and it is named as the Saring Soil Creep (Fig. 3). The slope angle at the head scar is about 35° and increases towards the toe reaching up to 80 degrees. A second large scar is formed on the upper slope west of Belautibisauna village and is called the Belautibisauna Landslide (Fig. 5). The landslide at the Saring village is active and slowly moving down the slope forming a large-scale soil creep (Fig. 6), which is evidenced by the tilted electric tower and drunken trees located within the moving mass. There are also many large tension cracks measuring in width from 5 to 15 cm, depth from 10 to 20 cm, and length from 1 to 8 m. A sag pond is observed on the upper slope of the Saring village, which is continuously recharging the ground.

The landslides located between the Saring Soil Creep and Belautibisauna are equally vulnerable to further sliding and can block the road at many places in the future (Fig. 5). The

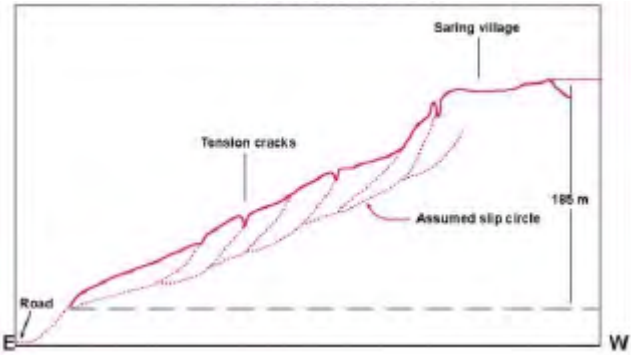


Fig. 6: Cross-section of Saring Landslide

debris deposited on the road has been recently cleared. Tilted overhanging rock boulders situated on the upper slopes of the road are highly vulnerable falling or sliding during a moderate to large earthquake, which can cause serious

accidents and block the road. The Belautibisauna Landslide is prone to further sliding. There are large wide-open tension cracks and fresh minor scars within the upper part of the slide zone. Large boulders are present within the detached mass (Fig. 5). It is expected that a huge amount of debris will be generated in the next event, which would further damage property and life in the Belautibisauna village. Some erosive, gullies are present in the upper reaches of the Belautibisauna Khola and in the northeast side of the Saring Soil Creep (Fig. 5). The formation of active gullies is an indication of soil erosion. Springs and seepages are common in and around the landslide areas. There is no vegetation within the slide zone, but the forest is being preserved in the lower part of the slide area.

CONCLUSION

The landslide area of the Chandisthan VDC consists of thick colluvial deposits. The sketch map (Fig. 3) shows many active landslides within the old landslide zone. They are the results of recent reactivation. The Saring Soil Creep and Belautibisauna Landslide are the most active slides in the area. Slopes ranging from 14 to 80 degrees represent the slide area. The toe of the Saring Soil Creep is almost vertical (i. e., 80 degrees). Most of the landslide area is covered by the paddy fields. There is no proper drainage system. According to Keefer's relation of magnitude versus distance of landslides from the epicentre, the area can be considered as susceptible to landslides in case of a larger magnitude earthquakes occurring within the reasonable distance from the landslide zone.

RECOMMENDATIONS

The effect of the Belautibisauna Landslide can be minimised by constructing check dams across the Belautibisauna Khola just below the first junction of the two tributaries, which are about 200 m upstream from the village. It is anticipated that the velocity of the floodwater could be reduced and the large boulders are expected to be deposited upstream of the check dams.

The possibility of flood damage in the vicinity of the Belautibisauna village can be minimised by constructing sidewalls along the banks of the stream leaving sufficient space between the walls for the stream. A proper drainage system should be arranged to drain out the water from the landslide areas, including the sag pond. Tension cracks should be sealed to prevent infiltration into and water percolation through the landslide area.

Road blockage is expected during the rainy season particularly between Saring and Belautibisauna due to slides. Hence, there should be provisions for the road repair during and after the rainy season. Slope protection works should be carried out at places in the area. If possible, the road should be realigned along the east bank of the Marsyangdi River where the ground is stable and the annual in maintenance costs could be minimised.

New houses should not be constructed at the Saring village. The residents be encouraged to resettle in the stable areas, such as in the vicinity of the present high school.

ARTICLES

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Programme for Enhancement of Emergency Response (PEER)

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BACKGROUND

The programme for Enhancement of Emergency Response (PEER) was initiated by the office of Foreign Disaster Assistance (OFDA) within the U.S. Agency for International Development (USAID) in 1998. It is a training-based programme and its maim propose is to enhance disaster response capacities in four Asian countries: India, Indonesia, Nepal, and the Philippines. These countries were selected to participate in the programme based on their high seismic vulnerability, their need to improve the disaster response capacity, and the interest on the part of their national governments to participate in the programme.

All of the involved countries either have prepared disaster response policies or have access to institutions that would help them to develop disaster response policies, but they do not have adequate emergency or disaster response programs as evidenced by a lack of training curriculum, lack of instructors, and lack of agencies to offer the training on an ongoing basis. While emergency medical response is at a different stage of development in each of the countries, none of them have fully established emergency medical response services. For these reasons, PEER was selected by OFDA as the best intervention to improve the standards of disaster responses and preparedness in the four countries.

The Asian Disaster Preparedness Centre (ADPC), Thailand, managed the first phase of PEER, 1998-2003. This phase successfully served to introduce the programme concept to the countries, to test and adapt courses to the Asian context, and to develop a cadre of instructors that were trained in the courses and could offer then in their own country, as well as lend support to conducting PEER courses in other countries.

The National Society for Earthquake Technology- Nepal (NSET) is managing the second phase of PEER, 2003-2008, with three U.S. base partners: International Resources Group (IRG), Safety Solutions, Inc., (SSI) and Johns Hopkins University Centre for International Emergency, Disaster and Refugee Studies of. Phase 2 includes expansion of the programme to Bangladesh. The focus of this second phase will be to support the nationalisation and institutionalisation of the program in the respective PEER countries.

The main purpose of PEER is to strengthen and institutionalise capacities in emergency and disaster response in the five participating Asian countries: Bangladesh, India, Indonesia, Nepal and the Philippines.

Its main goal is to reduce mortality in mass casualty events and increase the survival rates of disaster victims.

PROGRAMME OBJECTIVE:

The following are the main programme objectives.

• **Emergency Response Training:** Establish and strengthen the capability of PEER countries to provide collapsed structure search and rescue and basic and advanced life support, beginning with the first responders and continuing through the medical facilities.

• **Institutional Strengthening:** Develop a training system that continually provides disaster response with qualified personnel for search and rescue and medical first response and with medical facilities prepared to receive victims.

• **Networking and Coordination:** Establish a coordinating network of emergency and medical response and training institutions and individuals in PEER countries that ensures the continuation of the PEER process and further promote its evolution.

PEER Training Course

The PEER curriculum includes the following four interrelated courses.

1. Medical First Responder (MFR)

2. Collapsed Structure Search and Rescue (CSSR)

3. Hospital Preparedness for Emergency (HOPE)

4. Training for Instructor (TFI)

Medical First Responder (MFR)

Participants learn knowledge and skills necessary to assess, treat and transport patient the sick or injured as a result of an emergency of disaster. Staff of emergency and disaster agencies with first responder roles including fire departments, red cross/red crescent societies, police departments, and rescue organisations associated with local and national emergency response systems is the target audience for MFR. MFR is a 12- day course with 24 participants and 10 instructors. Professionals who successfully complete one of the core courses and tiff may attend an instructor's workshop. MFR-IW are a 5- day course with 4-8 instructors. This course contents the following topic.

• The Emergency Medical System

- EMS Operations
- The Human Body
- Situation and Patient Assessment
- Respiratory Emergency
- Cardio/ Circulatory Emergencies
- Haemorrhage and shock
- Soft Tissue Injuries
- Injuries to Muscles and Bones
- Burns and Environmental Emergencies Poisoning
- Medical Emergencies
- Infectious Disease and University Precautions
- Immobilisation and Transport
- Reports and Preparations
- Triage

Collapsed Structure Search and Rescue (CSSR)

CSSR provides the knowledge and skills necessary to search and mark collapsed structures, and stabilises and extricates victims using the safest and most appropriate procedures and available equipment. Emergency and disaster professional with first response search and rescue roles, including specialised staff of fire departments, red cross/red crescent societies, police departments, and search and rescue (SAR) groups associated with local and national emergency response systems are the target audience for this course. Professionals who successfully complete one of the three core courses and tiff may attend an instructor's workshop. CSSR-IW is a 7- day course with 4–8 instructors. Its course content is as follows.

- Planning
- Rescue Scene Organisation Search
- Basic Medical Care
- Emergency Building Shores
- Breaching and Breaking
- Lifting Heavy Objects
- Final Drill- Structural Collapse Scenario

Hospital Preparedness for Emergency (HOPE)

This course, still under development, provides the staff of hospital in seismically vulnerable areas with the knowledge and skills to asses and address structural and non-structural vulnerabilities of medical facilities to disasters. Participants also learn how to develop well-designed organisational and medical plans for responding effectively to mass casualty events and to maintain medical functions if their facilities are seriously damaged or rendered unusable by an earthquake or other disaster. The intended participants of the HOPE course include hospital administrators and leaders, doctors, nurses, and other medical and management staff of medical facilities in vulnerable areas. It requires 24 participants and 6 instructors and is run for 5 days. The HOPE course includes the following topics.

- Disaster management component:
- Seismic component;
- Hospital emergency incident command system (HEICS);
- Medical and emergency room triage; medical component (trauma);
- Public health issues (outbreaks, morgue, etc);
- Networking/coordination of the hospital;
- Commitments;
- Media relations;
- Equipment requirements and stocking locations;
- Power systems;
- Field hospitals;
- Hospital Planning
- Hospital assessment

Training for Instructor (TFI)

This course focuses on the skills needed to develop, present and manage effective training programmes. The target audience is anyone who is required to conduct skills-based training programmes. A desire to be effective instructors is helpful. This course, originally developed to train US firefighters, is now available in English, Spanish, Portuguese and French. TFI is a 5 - day course with 5 - Instructors.

FOUR CORE COMPONENTS

The following four core components comprise PEER.

Training Course Design, Development, Adaptation and Translation

This component includes the design of new courses and their adaptation to the regional context. Regional subject matter experts and course participants are closely involved in this process. Courses are then further adapted and tailored to the national context, including translation, to ensure they meet local needs and training requirements.

Training Courses at Regional, Sub-regional, National and Local Levels

Courses are first conducted at the regional and sub-regional levels for regional adaptation purposes. Once nationalised, courses are available for widespread use and for integration into existing institutions and training curriculum.

Instructor Development and Certification

NSET is working with the countries to ensure there is a continuous pool of certified instructors available to teach the

course within each country. Instructor workshops teach those who have taken the course how to put it on and how to present the instructional units.

Those with exceptional instructional capability are trained and certified as advanced instructors to revise and monitor the courses, and further develop other instructors.

Programme Nationalisation

This component works the countries to identify practical cost-effective measures to institutionalise the training, including integrating the courses into national system, organisations and networks. It also addresses the need for ongoing promotion of the programme.

PEER PROGRAMME, NEPAL

Nepal was a very active player in all aspects of PEER during Phase 1. A total of 232 participants and instructors were trained in Phase 1 with the following breakdown:

- 62 end-users participated in two national level MFR courses,
- 40 end-users participated one national level CSSR courses,
- 47 end-users were as TFI instructors in national, sub-regional and regional courses,
- 36 end-users were trained in CSSR sub-regional courses,
- 27 end-users were trained in two canine courses,
- 12 end-users were trained as instructors in MFR IW
- 8 end-users were trained as instructors in the CSSR IW

Many of these were reported to be excellent instructors and participants.

In addition to these courses, a special subsidiary training course on Canine Search and Rescue (CSAR) was developed for Nepal and offered twice, training a total of twenty-seven participants from the Army and Police. Similarly, some individuals attended both courses. Hence, the total number trained may be slightly less than 27.

ROLE OF NODAL AGENCY

Ministry of Home Affairs (MOHA), His Majesty's Government of Nepal, is the nodal agency for PEER. The following is the list of activates already carried out or planned to be completed in the near future by Nepal PEER Phase 2.

Nepal PEER Programme (phase 2)

- Country Planning Meeting held on the 5th of September.
- MFR task force established, the first meeting of the working group held on September 26, 2003.
- Two participants from the Ministry of Home Affairs attended the PEER Regional Planning Meeting, 17- 19 September 2003, New Delhi, India.
- Nepal will participants in two upcoming events-CSSR, MFR IW from 1- 14 December, at Hyderabad, India.

NEED TO ADAPT AND TRANSLATE THE COURSE MATERIALS

The courses need to be adapted and translated so that they can be more widely offered. It was recommended that the courses be adapted to the community level. However, in their present status, the courses are not designed to be used at this level and would require a considerable adaptation. More feasible, perhaps, is to incorporate elements of the courses into existing community-based disaster training offered by the Red Cross and other non-governmental organisations.

Main emphasis of Phase 2 will be on nationalise and institutionalise the PEER training programme in each of the PEER countries.

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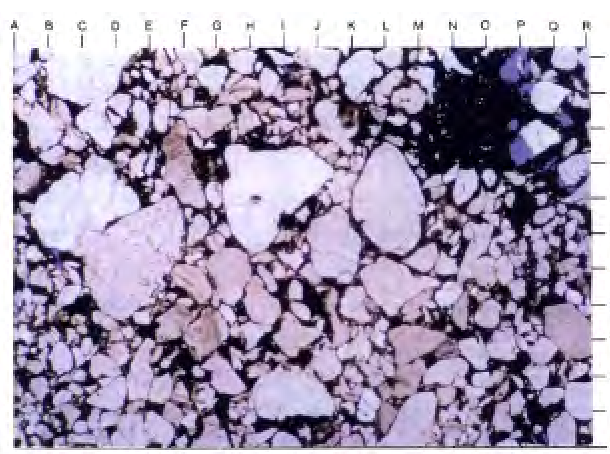

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ljleGg dfWodaf6 xfn;Dd ePsf]k|f/lDes cWoog–cGj]if0faf6 gkfndf oL tLg}6f cj:yfx? ljBdfg ePsf];Í]t kmf]hfk/sf]5 . xf08Sf{]sfa{g a9Ldfqfdf kf0Psf >f]t r§fg dVotM l;jflns dlg /x]sf lglZrt r§fgx?df b]vPsf]5 eg]pkoQm e08f/ r§fg l;jflns ;dx / cGo ;dxx?df klg b]vPsf]5 . pkoQm ef}ule{s ;/rgfx? t/fO{dlg ljleGg ulx/fO{df /x]sf]e"ef}ts tYofÍn] b]vfpF5 .

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gLkfndf dWod vfnsf]Pp6}s'jf dfq el6P klg b]zsf] cy{Gqdf 7hf] k]efj kg]{5 . vf; u/] OGwgdf v r{e}/x]sf] 8n/sf] 7hf] lx:;f jrt e}zf]wgfGt/ l:yltdf pNn]vgLo c;/ kg{5 . ;fy} oftfoft lf]qn]o;af6 kz:t kmfObf kfpg]5 eg]ljB't pTkfbg /

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o; jif{cGt/fli6«o ahf/df k|fs[lts ;fwgsf]dNo rsf{[9'+n] j[4 xF pTkfbs b]zx?nfO{kmfO{bf k'¥of]eg]c? b]zx? 7"nf]df/df k/]. tL pTkfbs sDkgLx?sf] dg{fkmf PsfPs j[4 xg{uO{o; Ifq4df nufgLsf]nflu k|z:t kFL pknJw e{x]sf]l:ylt ;[hgf ePsf]5 . o;n] ubf{s)f}:yfgdf l;dfGt /]vfdf /x]sf tL e08f/x? klg cfly{s ?kdf nfekb| xg]l:ylt ljsl;t eO{pTkfbgdf Nofpg] cj;/ k|Kt xg{5 . g|kfndf klg sfo{t sDkgLx?nfO{cGj]f0fdf a9L kFL vr{ug{pT;flxt agfPsf]5 eg] ;LdfGt :t/sf]tL jf UofF; e08f/ e]6Pdf klg ljsf; xg;Sg];e+fjgf a9/ uPsf]5 . bz j6f cGj]f0f v08x? dWo]afFL /x]sf tLg j6f cGj]f0f v08x?df klg cGt/f{i6« sDkgLx?n] cGj]f0fsf] nflu ?rL lng] cfzf /fVg ;lsG5 .

cGj]f0f ;kmnxg]cfzf

k|fs[lts kbfy{aGgsf nflu cfaZos kg][pkoQm ef}ule{ r§fg / ;+rgf Pj+xf08{s[ksfag{oQm >f]t r§fg t/f0{dlg /x]sf] tYo xfn ;Ddsf] cWoogn] b]vfPsf]5 . o; lsl;dsf r§fgx? r'/] kxf8sf] ;txdf klg e]6Psf 5g\. b}l/v / dlQmgfydf b]vg]UofF tyf tf]n] g|kfnsf] e"; txdlg st}ulx/fO{df k|fs[lts e08f/ /x]sf] ;Í]t ub{5g\. ef}ulns / ef}le{ ?kdf ljNsh t/fO{/ r'/];FF ldNbf]-hNbf]jftfj/0f ePsf]kfls:tfgsf]kf]tjf/ /ef/tsf]cf;fddf tL tyf UofF pTkfbg e}/x]sf]5 . k|fs[lts vfhL sfo{k|ljlws / cfly{ b[i6n]Hofb}v r{n'/ hf]vdk0f{ePsf]xF nufgLs tf{sf] cefjn] g} of] sfo{ cl3 a9g ;s]sf] lyPg . b;j6f cGj]f0f v08x? dWo];ftj6f v08x?df a]hfotL / cdl/sL tL sDkgLx?n] cGj]f0f z? ul/ ;s]sf] xF lagf /f]s6f]s lgwf{/t sfo{ofhgf cg';f/sf] lkmN8 sfo{md ;+fng xg ;s]df lgs6 eljiodf g} g|kfnsf] ;DefJo k|fs[lts ;Dkbfaf/]olsg xg]5 . xfn sfo{t tL sDkgL sg{0ghL{;+ ef/t / au+nfb]zdf tL / UofF; kQfnufO{ pTkfbgdf NofO;s]sf] ;kmn cge]j /x]sf] xF oxfFklg cGj]f0f ;kmn xg]cfzf /fVg ;lsG5 .

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eldut hnnf0{hf]vdkPf{xbaf6 arfcf}F

lg/ zfSo
Groundwater Resource Development Project
Babarmahal, Kathmandu, Nepal

eldut hn clt g}dxTjk0f{z'4 hn xf]. o;nf0{ Liquid Gold cyf{t\ t/n ;g klg eGg]ub{5g\. ljZjdf kof{Kt xb]kfgLsf] %) k|ltzt eldut hnaf6 cfkl't{ xb]ub{5 . xfdf] b]z gk]fndf eldut hn vfg]kfgL, pBf]uwGbf, l;+rf0{ cflbsf]nflu kof{Kt ug{ ub{5g\. ljleGg kof]hgsf nflu kof{Kt xb]eldut hn hldg dlg g}/xg] xF o;nf0{ cb[o >f]tsf ?kdf dfGg ;lsG5 . cb[o d} ePsf]xF of]hn kol'f0f cj:yfdf 5 jf 5}g, hf]vdkPf{ e0/x{sf] 5 jf 5}g, kb'zf]vg ug{ ;lsG5 jf ;lsb}g cflb s'/fx? t'Gt} cgbfg ug{ufxf]xG5 g}. ;fFr}g}dfgjLo sb[fsnfk, uNtL cflb sf/0faf6 of]hn hf]vdkPf{ cj:yfdf xb5 jf xb}5g oL s'/f af/] hfgsf/L lng' cfhsf]ljsf;sf]oudf ;fGble{s b]vG5 .

eldut hn Ps}:yfgdf jf lglZrt :yfgd}dfq ;lldt eP/ /xb}g, of]hn hldg dlg pRr efuaf6 xf]rf]efudf jxfj e0{g} /xG5 . o;y{dfgjLo sb[fsnfkaf6 eldut hn blift xb]k|n ;Defjgf /xG5 / sydsbflrt\blift e}xfn]df of]hnnf0{kb'zf]vg ug{nueu c;Dej g}xG5 . xfdf] b]zdf eldut hnnf0{;+hogzLn >f]tsf ?kdf lnPsf]b]vb}g . t/ cGo ljsl;t b]zx?dfof]>f]tnf0{ clt g};Djhogzln dfgL o;nf0{blift xg glbg ljleGg j}1flgs sb[fsnfkx? ckgfPsf xG5g\. ljz]ftl sb[fsnfkdf kl/kl't{ xb] lf]gsf];Alf0f ug{/ hf]vd xg glbg ul/g]ljleGg k/lf0f jf dNofÍg sfo{ug[. ;+f/d}hg;Vof a[4b/ j9bf]5, o;y{;+f/s}k'/oft e"hn ljz]f1x?n]eldut hnnf0{kblf0f{sf]rk{fafaf6 aflx/ /xg lbg ljleGg dNofÍg sfo{ug[/ dNofÍg kZrft kl/kl't{ xb]lf]g h:tf clt g};Djhogzln lf]gx?nf0{;Alft ug[pkfo cjnDag ul/;s]sf 5g\. ljz]f1x?åf/f ul/g]j}1flgs tj/sf]dNofÍgsf] cnfjf gful/s, gful/s ;dfh, gu/kflnsfx? klg r}tgzLn 5g\. pbfx/0fsf nflu :jL8g /fi6«sf]Pp6f gu/kflnsfn]cjnDag u/s] gLltnf0{oxfFng ;lsG5 . :jL8gsf]Pp6f ;fgf]zx/ ;d› lsgf/df cjl:yt udL{ofddf kfol :jL8gL hgtfx? labf dgfpg cfpg] zx/ 6fgd :6«8 (Tanum Strand) eGg]7fpFf gu/kflnsfs} kxndf eldut hnnf0{blift xg glbg Dry Toilet / Urine Separational Toilet cyf{t ;Vvf zf}rfno hxfFlk;fj / 7f]; dn cnu-cnu 7fpFf hDdf xb]lx;fan]o:tf Toilet sf]cjwf/0ff ln0{

gu/kflnsaf6 gdbfs}?kdf zf}rfno h8fg ug[]yfngL ePsf]5 . o; zf}rfnosf]dVo p2]ZJo dfgjLo dn / lk;fj hldgdf axfj xg glb0{eldut hnnf0{kblf0f xbaf6 arfp ug{xf]. lk;fjnf0{ ljleGg lfdtfsf 6bfÍLdf hDdf ub{5g\eg] 7f]; dnnf0{csf[6bfÍLdf . o;/L ;Vvf zf}rfnodf kfgL kof{Kt gxb]xF blift kbfy{axfj gxb]xG5 eg]csf[t/ lk;fjnf0{s[fs pkef]Qmf ;dX dfkm{t afnLgfnLdf kf]i6stfsf]nflu 5g[sfo{df a]rlavg xb] xF gu/kflnsfnf0{s}L xb;Dd cfly{s nfe klg xb]ePsf] b]vG5 . xg t o:t}lsl;dsf zf}rfno xfdf] b]zdf klg vf}sgf, aªdlt lf]gdf s}g}Ps ;+yfaf6 yfngL e}/x}sf] rrf{5 . of] lglZrt ?kdf /fdf[]sfo{ePsf]xF o; sfo{nf0{ceM a9L kf[];flxt ug{kg[cfjZostf xG5 . t/ o;sf]dVo kof]hg afnLgfnLsf]pj{f zlQm x[; xg glb0{kf]i6stf kbfg ug{xf]. t/ eldut hnnf0{klg blift xg glbg]k|jlw klg ePsf]xF ;j{fwf/0f pkef]Qmfnf0{ hfgsf/L lbg'kg]h?/L 5 . ;fy}o:tf k|jlwx? dfly pNn]v u/]eMf+ ;DjlGwt gu/kflnsfaf6 g}kxn ug{h?/L 5 .

sf7df8f}pkTosfdf vfgkfgLsf]dfu hg;ªVofsf]rfk ;Fg} a9bf]5, vfgkfgLsf]nflu ceM %) k|ltzt t eldut hn g} kof{Kdf Nof0/x}sf 5g\ eldut hnsf]kof{Kt j}1flgsx?sf];Nnfxsf] ljk/lt klg lgsfNg]qmd a9bf]g}5 . o; sfo{nf0{lgoGq0f ug{ cfsfz]kfgL cyf{t jiff{sf]kfgLnf0{kof{Kt ug{k|jlw ;Dd k|rf/df Nofpg ;lsPsf]5}g . o; sfo{sf nflu klg ;DjlGwt gu/kflnsfx? hfu?s xbkg[dxz'; b]vG5 . jiff{sf]kfgL ;ªsng u/L kof{Kdf Nofpg 5fgfaf6 v:g]kfgL (Rooftop water) nf0{;ªsng l5d}sL /fi6«aËnfb]zdf u}/;/sf/L ;3 ;+yf dfkm{t Jofks hg:t/df k|rf/ e0{sfo{yfngL ePsf]b]vG5 . t/ sf7df8f}pkTosfdf o; lsl;dsf] k|rf/-k|;f/ ePsf]kf0F}g .

;DjlGwt e'}1flgs tyf eldut hn lj1af6 cg';Gwfg u/L eldut hnnf0{kblf0faf6 dQm /fVg eldut hn sfgbsf]Joj:yf xg'cToGt h?/L xg cfpF . t/ /Hon];j{fwf/0fnf0{v'zL kfg{/ lfl0fs :jfy{sf nflu o; ;DjGwdf g}/fZotf b}vf0Psf]kf0G5 . h:n]ubf{hxfFrfXof]ToxfFeldut hn lgsfNg]/ kof{Kdf Nofpg] ul/Psf]5 . o;/L lgsflnPsf]hnaf6 kl5 s}lt c;/ k5{ljrf/

ul/Psf]5g\ . xg\ ;S5, o;n]ubf{eljiodf 7"nf]kl/sf]ksf]?k lng ;S5 . 1fgsf]cefjdf eldut hn kbluf0fsf] rk6fafaf6 aRg ufxf] xG5 . eldut hnsf]kblif0f, eldut hnsf]1fg / eldut hnsf] sfg'gsf]cefjdf xg\]u5{. o;y{hg;\Vof rfk ;Eo}a9bf]qmddf ;]\6s 6bfª\s hyfefl j tl/sfaf6 lgdf{0f e0{x}sf]/ kl/klt{xg\] lfq\sf] ;#lt0f gxbF sd ulx/f0{sf]eldut hn kbluf0f xg\];Defjgf al9 g}xg\]b]vG5 . 6f0{kmf0{8, emf8f kvfnfsf]cnfjf ;]\6s 6bfª\sLsf] ld>0faf6 eldut hndf gf06\6]\k efu a9L ;#Ugtf xg\] / o:tf] cz'4 kfgL lkpbF gf06\6]\k sf]dfqf /utdf kf0g\]x]dfl]nf]agdf ldl;g u0{clS;hgnf0{rnvh ug{]lfdtfsf]b/ sd xg\ u0{:jf:Yonf0{ c;/ xg\]8/ xG5 .

sf7df8f}+pkTosfdf gLhL:t/df lgdf{0f ul/Psf c;kmn 6b'ajh]x?df un}+f /#fP/ hDdf ePsf /f;folgs emf]h kbfy{ vGofpg]u/]sf]r rf{klg grn]sf]xf{Dg, t/ :jR5 eldut hnnf0{ ljiffbL emf]h ld;f0{bllft ug{Joj;foLnf0{sf/jfxL ug{]lsl;dn] sg\}lsl;dsf]eldut hn sfgg\ klg t 5g\ . o;y{eldut hn bllft kZrft k]zf]vg ug{nueu c;Dej ePsf]sf/0f hgr]tgf huf0{dflg;sf]wf/0ffsf]kl/jtg{sf] ;fy;fy}dxfgu/kflnsf / ;DjlGwt dGqfnon];d]t cfjZos ;f]r lng'kg]a]hf ePsf]5 . xg\ t zx/Ls/0fsf]gfddf sf7df8f}+pkTosfdf olt a:tL ljsf; e0{ s]sf]5 ls eldut hn kl/klt{xg\]lfq ;d]t vfnL gxf]hf ls eÌ]klg nfUb5 . o;y{af6f] pBf]u tyf cGo ;#rgf cflb ljsf; lgdf{0f sfo{ubf{o:tf lfq\nf0{c;/ gkg]lsl;dn]ljrf/ k¥ofpg' h?/L 5 . olx tYonf0{dgg\u/L eldut hn ;DjlGwt j]1flgsx? sf] e]hfdf ;g\!(&) df eldut hnnf0{ kbluf0f xg\ glbg Vulnerability Risk Assessment cyf{ hf]vdk]{ug{ dNbfÍg tl/sfsf]ljsf; ePsf]5 . of]Ps lsl;dsf] ;fÍ]ts tl/sf xf] h;af6 kfgLsf]:y/ n]en, hg;ªVofsf]rfk, kl/klt{cflbsf]cWoogaf6 eldut hn ;#lt0f lfqsf]ljsf; ug{;lsG5 . sg\}klg ofhgf 5gf}6 ug{Vulnerability range cg';f/ ljleGg lhof]hf]hsn / xf08f]hf]hsn tYofªsx?df kbfg ug{ef/ tyf cÍsf ofu]kmnsf] cfwf/df cWoog ug{of]t/Lsfaf6 kbllft xg\]lfq jf kbllft gxg\]lfqsf] klxrfg ug{;lsG5 . a9L ;fÍ]ts cÍ ePdf a9L g}Groundwater Pollution Potential xG5 . ljsl;t b]zx?df eldut hnsf] b[i6sf0faf6 ;#lft ug{kg{lfqsf]/fd}tj/n];#lt0f u/]sf]xG5, hxfFdfgj a:tLsf];fy}v]tLkftL, au+"kfng cflb sfo{sf]k/}/f{sj6 g}u/]sf]xG5 . cli6®fdf t eldut hn ;#lt0f lfqdf sf8]tf/ ;d]t nuf0{kfnfkx/f g}/flvPsf]xG5 .

Vulnerability Assessment sf nflu dVotof lgDg s'/fx?sf] cWoog ug{cfjZos xG5 . ;#lt0f lfq ls6fg ubf{slt hldgdlgsf] ulx/f0{Dd kbllf xG5 cflb s'/fx?sf]cWoog ub5g\. hg\ ;f/f± ?kdf tn j0fg\ ul/Psf] 5 .

<u>D = Depth to the Groundwater body</u>

eldut hnsf]hf]vdkg ulx/f0{df e/kg{xG5, sd ulx/f0{df a9L hf]vd xg\;Sg]xbF kfgLsf]:yL/ n]en cg';f/ klg hf]vd xg\]jf gxg\]egL ;fÍ]ts ?kdf cWoogsf]aIfdf ;dfj]z ug{ ;lsG5 . pbfx/0fsf nflu kfgLsf]:yL/ n]en)–!=% ld6/ ePsf] lfqdf Pesticide kbf{u ubf{lfqnf0{!) ef/ lb0Psf]xG5 . !% b]v @# ld6/ kfgLsf]:yL/ n]en ePsf]lfqdfPesticide kbf{u ubf{# dfq} ef/ lb0Psf]xG5 . o;/L lfq cg';f/ km/s km/s ef/sf] h8]af6 Pollution potential / non-potential lfqsf]klxrfgul/G5 .

<u>R = Recharge</u>

kl/klt{xg\] lfq ;#lft gxbF klg dfgj{o uNtLsf sf/0faf6 eldut hn bllft xg\;S5 . o;y{kl/klt{sf]b/ a9L ePsf]lfqdf a9L g}eldut hn hf]vd xg\ ;Sg]xbF o:tf lfqnf0{ ;#lt0f ubf{ eldut hnnf0{:jR5 /fVg ;lsG5 .

<u>A = Aquifer</u>

kfgL lbg]tx cyf{ PlSjkm/ a9L vNnfkg k]z/0fzLn lfdtf ePsf cGo txx?;Ef Pscsf{df ;#Ugtf e0{kmhfj6 ePdf klg eldut hn hf]vd xg\ ;Sg]a9L ;Defjgf b]vG5 .

<u>S = Soil type</u>

PlSjkm/ Confining ePsf]cyf{ kfgL lbg];Sg]txsf]tndf y ck]z/0fzLn lfdtf ePsf]df6f]sf]tx ePdf hf]vd sd xg\ ;Sg] t/ txdf kfgL ;f]g]tyf klf]0f lfdtf a9L ePdf eg]hf]vdk0f{xg\ ;Sg]xG5 . v;|kg ePsf]tx dl;gf s0f ePsf]txeGbf a9L hf]vd xG5 .

<u>T = Topography</u>

e"-w/ftn klg eldut hn hf]vdkg gfKg]tl/sf xf]. h:t} rL/f, b/f/kg gePsf tfhf r§fg a9L hf]vd gxg\]vfnsf]xG5 eg]vfN8f vN8L, pRr / xf]rf e"-efuaf6 eg]kfgL a9L l5§} ;f]g]xbF eldut kfgLnf0{hf]vdk0f{ug{tTjx? rf8]g}e"-hnef cyf{ Groundwater body df kUg ;S5g\. ;fy}le/fnfkg txdf eldut hn sd bllft xG5 lsgeg]o:tf w/ftndf eldut hnsf] jl[a9L xG5g\.

<u>I = Impact of the vadose zone</u> (zone between the soil and the top of the aquifer)

kfgLsf] nfu]n dflysf] tx sd leh]sf] (Unsaturated) ePdf klg eldut hndf hf]vd xG]kl tzt a9L xG5 . ljz]f u/L s8f r§fgdf eldut hn cGj]f0f sfo{df of] s/fsf]Wofg lbg' h?/L 5 . s8f r§fgdf eldut hnsf] af6f]g}b/f/ / rL/f k/]sf] lf]g unsaturated xG]ePsfn] ;\ofTds ?kdf hf]vd a9L xG] ;efjgf xG5 .

<u>C = Hydraulic Conductivity</u>

sG}lf]gdf kfgL lbg] txsf s0fx? a9L g}k|;/0fzLn lfdtf ePsf ePdf eldut hn hf]vdk0f{xG ;Sg]a9L ;Defjgf xG5 .

PlSjkm/sf] of] u0f kDk 6]6af6 hfgsf/L lng ;lsG5 . t;y{dfly pNn]vt ef/ / c\$ Vulnerability range cg';f/ kbfg u/L cWoog ug{ DRASTIC aF]fx?nf0{ /fdf|L Wofg lbP/ hg;\of tyf pBf]ux?sf]a9L rfk ePsf lf]gx?df cfjZos cg';Gwfg u/L ;Al0f lf]gx?sf]klx rfg ug{g}cfhsf]kfdlV cfjZostf xf]. oL s/fx?nf0{ dgg u/L hg–hfu/0fsf sfsfnfk u/L eldut hnnf0{kbl\0fsf] hf]vdaf6 arfcf]F eljiosf ;GtltsfnfIu :jR5 kfgLsf]Joj:yf u/fF].

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Status of Mugling–Narayanghat Water-Induced Disaster Prevention Project (MNWIDPP)

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BACKGROUND

The Mugling–Narayanghat Highway, which is about 36 km long, is probably the most important road connecting the capital city of Kathmandu with the outside world via the Terai. Over 90 % of daily consumer goods, other commodities, industrial raw materials, and fuel are being transported through this highway. Obviously, export market of the country heavily depends on it too. Thus, the day-to-day economy of the country is governed by this very road.

Geologically, this road section crosses a series of formations ranging from the recent Alluvium and Siwalik Group, to the Nawokot Group. A little more than northern half section is covered by the Precambrian metasediments while southern half is covered by sedimentary sequences of varying ages. Similarly, this section is intersected by several tectonic zones ranging from regional to local scale.

More importantly, after the intense rainfall (446 mm in 24 hours at Devghat, the confluence of the Kali Gandaki and Trisuli Rivers) of 30th and 31st July 2003, numerous landslides, debris flows, slope failures, rock falls and other mass movement were triggered on the Mugling–Narayanghat Road corridor. This event caused road blockage for several weeks. Emergency measures were taken to reopen the road. However, it remained far from being fully-operational causing an acute shortage of food and fuel in the capital affecting 2 million people.

PROJECT INCEPTION

Realising the seriousness of the problem and its future impact on socio-economic front, the Department of Water-Induced Disaster Prevention in close co-operation with JICA took initiatives towards mitigating this problem before it gets enlarged. This initiative culminated into a three-years project named "Mugling–Narayanghat Water-Induced Disaster Prevention Project" under the grant assistance of the Government of Japan. The project was rather quickly conceptualised largely based on the two-day field visit by a team of Japanese short-term and long-term experts as well as the Nepalese counterparts. Thirteen major disaster sites (Table 1) were identified by the team. Of which, three sites were tagged "critical". The decision was made realising the importance of a need to take action as soon as possible, i.e., before the beginning of next monsoon.

OBJECTIVES

The prime objectives of the project are to carry out:

1. Short-term or immediate measures
2. Detailed investigation, and
3. Implementation of long-term measures.

PROJECT PERIOD AND COVERAGE

The Project will be realised within the next three years, i.e., between FY 2004/05–FY2006/07 in the Chitwan, Tanahun, and Gorkha districts

PROJECT COST

The Proposed Project cost is as follows.

Immediate measures	NRs. 1,00,00,000.00
Detailed Investigation	NRs. 20,00,000.00
Implementation of long-term measures	NRs. 28,60,00,000.00
Administrative cost	NRs. 40,00,000.00
Total	**NRs. 30, 20, 00,000.00**

PROGRESS STATUS

The Mugling–Narayanghat Water-Induced Prevention Project Office at Bharatpur, Chitwan District, was established on 20 January 2005. However, the work place for the staffs was in poor condition and the building needed a major repair and maintenance. By mid May 2005. The repair and maintenance of office building will be completed. Preliminary report of the above-mentioned team was the first-hand document to carry out the field activities.

Meanwhile, attempts were made to verify sites and carry out design and estimate of mitigation works. Owing to the hard work of site engineers despite several practical difficulties, the project has been able to commence mitigation works at three sites as mentioned below.

I. Chainage (Km 30 + 890 m)

This site is highly vulnerable to slope failures and debris flow. A huge unstable soil mass, which might trigger debris flow lies just upstream of the road. Gully erosion is also active

Table 1: Thirteen vulnerable and hazardous sites for sediment-related water-induced disasters

No.	Location (From Narayanghat)	Type of Disaster	Damages	Remarks
1	34 km	Debris flow	Highway was covered by debris	
2	33 km	Slope failure	Highway was covered by loose mass.	
3	33 km	Scouring	Edge of highway is collapsed and broke the road shoulder.	
4	31 km	Slope failure and debris flow	Highway was covered by loose mass. The loose mass of slope failure which occurred near the stream damaged road as the debris flow.	
5	22 km	Bank scouring and landslide	The bank of Trishuli river was scoured by the high flood and the road shoulder was broken. It triggered the landslide movement.	Critical
6	21.5 km	Debris flow	Debris flow covers the Mohare Bridge still now.	
7	20.9 km	Debris flow	Highway was covered by debris.	
8	19 km	Debris flow	Highway was covered by debris.	
9	11 km	Debris flow and rock fall	Highway was damaged by the debris flow and rock fall. Some huge rocks are still remaining on the road and above it.	
10	12.5 km	Debris flow	There was no damage on the road by this debris flow, but the stream is filled up with debris.	
11	11.3 km	Debris flow	The bridge was partly-damaged by the debris critical flow. Only 3 m of the bridge span is remaining.	Critical
12	10.4 km	Debris flow	There was no damage on the road by this debris flow, but the stream is filled up with debris.	
13	Marsyangdi Powerhouse	Debris Flow	The bridge was washed away and the building of powerhouse was damaged by the debris flow	Critical

in this area. To control this unstable area, the following measures of them were have been already planned and some implemented.

Structures	Planned	Completed
a) Gabion check dams	23 nos.	12 nos.
b) Drainage	60 m	35 m
c) Cascade	30 m	–

II. Ruwa Khola (Lower Marsyangdi Powerhouse)

This site falls within the high risk zone for debris flow, which was demonstrated during the wild debris flow event on 31 July 2003 that damaged infrastructures worth over 50 million Nepalese rupees. This site needs a long-term mitigation measures. Accordingly, site engineers in close consultation with the JICA short term expert have designed two numbers of concrete Sabo Dams in the first phase. Both the dams will be 7 m wide. This is first of its type in Nepal in all respect. This site will be kept under close observation and based on the finding, the second phase will be designed.

III. Khahare Khola

This site is also highly vulnerable to debris flow. A huge amount of debris material comes every monsoon from upstream, often with boulders bigger than the bridge height roll down and hit the bridge. In the year 2003, half of the bridge was washed away. This site also needs a long-term mitigation measures. Accordingly, the site engineers in close

consultation with JICA short-term expert, have designed two concrete Sabo Dams in the first phase. Both the dams would be 7 m wide. This site will be kept under close observation and the second phase will be planned accordingly. However, it is also planned to develop a park at this site.

CONCLUDING REMARKS

It was a hard to come up with the Mugling–Narayanghat Water Induced-Disaster Prevention Project. Every one of us knows that our country is facing a difficult situation. At this point of time, it is extremely difficult to do things be it a big job or be it a small one. Therefore, there is no guarantee that the project will be completed in time within the proposed budget. The project team is fully committed to do the best it can.

CONGRATULATIONS

The Nepal Geological Society extends its hearty congratulations to Dr Indra Raj Humagai, Life Member (LM 310) of the Nepal Geological Society and Lecturer of Department of Civil Engineering, Institute of Engineering, Pulchowk, who was given **His Royal Highness the Crown Prince Youth Science and Technology Award** by the Royal Nepal Academy of Science and Technology for his research on the origin and application of geotechnical zoning system in the study of landslide and engineering design in mountainous areas.

Dr I. R. Humagai

Mr A. M. Dixit

The Nepal Geological Society congratulates to Mr Amod Mani Dixit, Life Member (LM 25) of the Nepal Geological Society and Executive Director of National Society for Earthquake Technology Nepal, who received **Academy Science and Technology Promotion Award** from the Royal Nepal Academy of Science and Technology for his contribution to the development of an Earthquake risk evaluation technology and for raising people's awareness in disaster reduction.

The Nepal Geological Society extends its hearty felicitation to Dr Ramesh Man Tuladhar, Life Member (LM 61) President of Nepal Geological Society and Project Chief of the Mugling-Narayanghat Water-Induced Disaster Prevention Project, Department of Water Induced Disaster Prevention, who obtained **Bhubaneshwar Technology Award** from Royal Nepal Academy of Science and Technology for his successful application of "SABO" technology in Nepal to diminish the erosion-induced loss.

Dr R. M. Tuladhar

Mr R. K. Aryal

The Nepal Geological Society congratulates Mr Ramesh Kumar Aryal, Life Member (LM 3) and Former President of Nepal Geological Society, who has been appointed as the Director General of **Hetauda Cement Factory**, Hetauda, Nepal.

The Nepal Geological Society expresses its hearty congratulations to Dr Pramod Kumar Thakur, Life Member (LM 339) of the Nepal Geological Society on his successful completion of the Ph. D. degree in Geology from Tribhuvan University, Kathmandu, Nepal in 2001. The title of his thesis was **Geomorghological Evolution and Environmental Assessment of the Arun Valley Watershed, Eastern Nepal.**

Dr P. K. Thakur

Dr C. K. Chakrabarti

The Nepal Geological Society extends its hearty felicitations to Dr Chanchal Kumar Chakrabarti, Life Member (LM 57) of the Nepal Geological Society on his successful completion of the Ph. D. degree in geology from Tribhuvan University, Kathmandu, Nepal in 2003. The title of his thesis was **Geology and Geochemistry of the Zinc-Lead Deposit of Ganesh Himal, Central Nepal Himalaya.**

RECENT PUBLICATIONS

The Nepal Geological Society is regularly publishing its Journal of Nepal Geological Society and News Bulletin. So far the Society has already published 30 volumes (Regular volumes and Special Issues) of the Journal and 22 volumes of News Bulletins. Recently, it has published the Proceedings of the Fourth Nepal Geological Congress (Volume 30, Special Issue). The Proceedings include 19 scientific research papers on various fields of geoscience.

Some Rcently Published Books

Tectonics of the Nanga Parbat Syntaxis and the Western Himalayan, edited by M. A. Khan, P. J. Treloar, M. P. Searle and M. Q. Jan. Geological Society Special Publication No. 170, 492 pages, Hardback ISBN 1–86239–061–4 Publication, March 2000. List Price US$ 150.

Mitigation and Management of Flood in Nepal - 2000 by Dr Meen B. Poudyal and Mr Damodar Bhattarai, 2001.

Application of Geographic Information Systems (GIS) for Integrated Assessment and Management of Mineral Resources in North-East Asia, Mineral Resources assessment, Development and management Series Volume 7, Published by UN/ ESCAP in 2001.

Integrated Assessment and Development of Mineral Resources in the Great Mekong Subregion, Vol. II/ ESCAP 1999. Mineral concentrations and hydrocarbon accumulations in the ESCAP Region.

Structural Geology: **A practical guide to surface and subsurface map interpretation** (Textbook) by R. H. Groshong, Springer, 1999, 320 pp. ISBN 3540654224.

Analytical Solutions of Geohydrological Problems by G. A. Bruggeman. Elsvier, 1999, 970 pp, ISBN 0444818294. Price US$ 465.00.

Cambridge guides to minerals, rocks and fossils by A. Woolley et al. Cambridge University Press, 1999. 336 pp. ISBN 0521778816, Price US$ 465.00.

Earth Science and Environment (2nd edition) by Graham R. Thompson, Saunders College Publishing 1999, ISBN 0030060486.

Earthquake Geotechnical Engineering (Proceedings of the 2nd International Conference, Lisbon, Portugal, 21-25 June 1999, 3 volumes) by P. Secoe Pinto, A. A. Balkema, 1100 pp. ISBN 0444818294, Price US$ 215.00.

Environmental Assessment Practice Guide by Barbara Carol and Trevor Turpin. Thomas Telford Ltd. 1999, 150 pp., ISBN 0727727818, Price UKL 20.00.

Flood and Landslide: Integrated Risk Assessment (Environmental Science) edited by R. Casale and C. Margottini. Springer, 1999, 320 pp., hardback, ISBN 3540649816, Price UKL 96.00.

Geostatistics in Petroleum Geology by Oliver Du Burle, Continuing Education Course Notes #38, Cat. #908, The American Association of Petroleum Geologists, 1998, ISBN 0891811877, Member Price US$ 24.00; List price US$ 30.00.

Geostatistics for Engineers and Earth Scientists by R. A. Olea. Kluwer 1999, 328 pp., ISBN 0792385233.

Geostatistics for Environmental Scientists by R. Webster and M. A. Oliver, John Wiley, 1999. 442 pp., ISBN 0471965537, Price US$ 76.50.

Geotechnical Engineering: Principals and Practices by Donald P. Coduto, Prentice Hall 1999, 750 pp., hardback, ISBN 0444818294, Price US$ 110.00.

Groundwater pollution control edited by K.L. Katsifarakis, WIT Press, 1999, ISBN 1853126756, Price UKL 112.00.

Hydrogeology and Engineering Geology of Sinkholes and Karst (Proceedings of the 7th Multidisciplinary Conference on Harrisbug Hershey, PA. USA. 10-14 April 1999) edited by Barry F. Beck et al., A.A. Balkema, 1999, 480 pp., hardback, ISBN 9058090469, Price US$ 115.00.

On the determination of sediment accumulation rates (Georesearch Forum, Vol. 5) edited by P. Bruns and H.C. Hass, Trans Tech Publications Ltd., 1999, 256 pp., ISBN 0878498370, Price UKL 58.00.

Slope Stability by Anderson. John Wiley 1999. ISBN 084934106.

Soil Mechanics and Geotechnical Engineering (Proceedings of 11th Asian Regional Conference, Seoul, Korea, 16-18 Aug. 1999) edited by Sung-Wan Hong, A.A. Balkema 1999,. Two vols. 900 pp. Price US$ 85.00.

Soil Mechanics and Geotechnical Engineering (Proceedings of 12th African Regional Conference, Durban, 25-27 Oct 1999) edited by Peter Day. A. A. Balkema, 1999, Vol. 3, 1200 pp., ISBN 9058090825, Price US$ 152.00.

Mineralogy Tutorials, Interactive instruction on CD-ROM Version 2.0 by C. K. Lein., John Wiley 1998, Price US$ 49.95.

Engineering and General Geology, 2005, S. K. Kataria & Sons, 580 pp., Price IC 195.00.

Paryawaran Monthly, Vol 30, 2005, Vatawaran Tatha Bal Sarokar Snastha Nepal *(In Nepali)*.

Journals of NGS

Journal of Nepal Geological Society, Volume 30 (Special Issue), December 2004 (Proceedings of 4th Nepal Geological Congress held on 9-11 April 2004 in Kathmandu, Nepal)

Journal of Nepal Geological Society, Volume 29, June 2004

Journal of Nepal Geological Society, Volume 28, June 2003

Journal of Nepal Geological Society, Volume 27 (Special Issue), September 2002 (Proceedings of 3rd Nepal Geological Congress held on 26-28 Sept 2002 in Kathmandu, Nepal)

ANNOUNCEMENTS

We are pleased to announce that the Nepal Geological Society is going to organise the **Fifth Asian Regional Conference on Engineering Geology for Major Infrastructure Development and Natural Hazards Mitigation** in collaboration with the International Association for Engineering Geology and the Environment (IAEG), and Asian Regional Groups of IAEG on 28–30 September 2005 in Kathmandu, Nepal. All our members are requested for their kind cooperation and necessary help to make the conference a grand success. All the interested personnel are also requested to contact Dr R. P. Bashyal, Convener of the conference and Dr M. R. Dhital, Co-convener of the conference for necessary information. The First and Second circulars of the conference have already been published and distributed. The Third Circular will be distributed in June. For all inquiries and correspondence, write to:

The Fifth Asian Regional Conference Organising Committee
Nepal Geological Society
PO Box 231, Kathmandu, Nepal
Email: iaegnepal@ngs.org.np
Website: http://www.ngs.org.np/iaeg.htm
Fax: 00977-1-4331325

IAEG 2006

ENGINEERING GEOLOGY FOR TOMORROW'S CITIES
The 10th IAEG Congress, Nottingham, United Kingdom, 6-10 September 2006

Further information and full details of the Congress can be found at www.iaeg2006.com
The Congress Office can be contacted by e-mail at info@iaeg2006.com
Enquires related to the Technical Programme should be e-mailed to programme@iaeg2006.com
Organising committee
IAEG2006 is being organised by the IAEG UK Section and the Engineering Group of the Geological Society of London with the following Executive Committee:
Professor Mike Rosenbaum (Honorary President)
Dr Jim Griffiths (Chair) - University of Plymouth
Dr Andrew Pitchford (Secretary) - CIRIA
Dr Graham Garrard (Treasurer) - Halcrow Group
Professor Martin Culshaw (IAEG UK Representative) - British Geological Survey

NEWS CLIPS

२६ चैत २०६१ शनिबार चैत कृष्णपक्ष औंसी नेपाल संवत् ११२५ KANTIPUR, Nepali National Daily, Friday

१२ वैज्ञानिकलाई पुरस्कार

काठमाडौं, २५ चैत (कास)- नेपाल राजकीय विज्ञान तथा प्रविधि प्रज्ञा प्रतिष्ठान (रोनास्ट) ले १२ वैज्ञानिकलाई पुरस्कृत गर्ने निर्णय गरेको छ।

मन्त्रिपरिषद् उपाध्यक्ष एवं रोनास्टका सहकुलपति डा. तुलसी गिरीको अध्यक्षतामा बिहीबार बसेको २१औं प्राज्ञसभाले विभिन्न सात पुरस्कारअन्तर्गत विज्ञान तथा प्रविधिको क्षेत्रमा उल्लेखनीय भूमिका निर्वाह गर्नेलाई पुरस्कृत गर्ने निर्णय गरेको हो।

यसअन्तर्गत भाइरल हेपाटाइटिस तथा कलेजोसम्बन्धी अन्य रोगको अनुसन्धानमा सक्रिय डा. सन्तोषमान श्रेष्ठ श्री ५ वीरेन्द्र विज्ञान तथा प्रविधि प्रज्ञा पुरस्कारबाट पुरस्कृत हुनुहुनेछ। प्रत्येक दुई वर्षमा प्रदान गरिने यो पुरस्कारको राशि एक लाख रुपैयां छ। बर्सेनि प्रदान गरिने जनही ३० हजार राशिको श्री ५ युवराजाधिराज युवा विज्ञान तथा प्रविधि पुरस्कारबाट सूक्ष्म जीवविज्ञ डा. अञ्जना सिंह, शल्यचिकित्सक डा. गणेश डंगोल, मुटुरोगविज्ञ डा. राजीव राजभण्डारी र इन्जिनियर डा. इन्द्रराज हुंमागाईं पुरस्कृत हुनुहुनेछ।

बर्सेनि प्रदान गरिने प्रज्ञाप्रतिष्ठान विज्ञान तथा प्रविधि प्रवर्द्धन पुरस्कारबाट गणितविज्ञ डा. आशकुमार राई एवं भूगर्भविद् आमोदमणि दीक्षितलाई प्रदान गरिने भएको छ। यसको पुरस्कार राशि जनही २० हजार रुपैयां छ। यस्तै तेस्रो विश्व विज्ञान प्रज्ञाप्रतिष्ठान पुरस्कारबाट गणितशास्त्री डा. कन्हैया झा र भौतिकशास्त्री डा. राजु खनाल पुरस्कृत हुनुभएको छ। यो पुरस्कारको राशि ३५ हजार रुपैयां छ।

प्रत्येक दुई वर्षमा प्रदान गरिने २५ हजार राशिको मोहनध्वज बस्नेत प्रविधि प्रज्ञापुरस्कारबाट वैकल्पिक ऊर्जाका क्षेत्रमा क्रियाशील हिरण्यप्रसाद शर्मा पौडेल र भुवनेश्वर प्रविधि पुरस्कारबाट डा. रमेशमान तुलाधर एवं जितबहादुर नकर्मी एवं धातु प्रविधि पुरस्कारबाट नेपाल नेत्रहीन संघका रमेश दाहाललाई पुरस्कृत गर्ने निर्णय गरिएको छ।

रोनास्टले विसं २०६१ देखि विज्ञान तथा प्रविधिका क्षेत्रमा विशेष भूमिका निर्वाह गर्ने प्रतिभाहरूको सम्मान गर्दै आएको छ।

THE RISING NEPAL April 10, 2004 Saturday Kathmandu

Fourth Geological Conference kicks off

RSS

LALITPUR, April 9: Inaugurating the three-day "Fourth *Nepal* Geological Conference" organised by *Nepal Geological* Society here Friday, Tribhuvan University Vice Chancellor Prof. Dr. Govinda Prasad Sharma said that significant success could be achieved in the field of geology through these kinds of conferences.

Stressing that *Nepal should* also make achievement in geology as achieved by other countries, he called upon the geologists to adopt the positive aspects of the geological situation.

Vice Chancellor Dr. Sharma also provided honorary membership of Nepal Geological Society to renowned Geologist Prof. Dr. K.S. Waldiya of India and Prof. Dr. Petrick Le Fort of France in recognition of their contributions in geological research of the Himalayan areas.

Society president Pratap Singh Taatad said that these kinds of conferences are organised once in every three years and over 600 geologists at home and abroad are associated *with the* society.

On the occasion, Prof. Dr. K.S. Waldiya of India and Prof. Dr. Petrick Le Fort of France thanked the society for evaluating their contributions in research *on the* Himalayas and expressed the confidence that the conference will prove to be a milestone in the field of geology.

Over 150 geo-scientists from seven countries including Nepal are taking part in the conference while 60 experts will present *working papers* on various topics and shed light on *the* latest research works being undertaken in this field.

Detailed discussions will be held on the geological situation of the Himalayas, natural heritage, environmental degradation, natural disaster and geological risks *management*.

NEW MEMBERS OF NEPAL GEOLOGICAL SOCIETY

Membership Number	Name	Mailing Address
LM-505	Tanokura Tatuhiro	Institute for Himalayan Conservation, 3-5-7-207, Yoyogi, Shinjuku-ku, Tokyo, Japan, Email: ttanokura@hotmail.com
LM-506	Tej Prasad Gautam	Bageshwari-1, Banke, Nepal, Email: tejpgautam@yahoo.com
M-507	Sanjeev Kumar Shakya	Nepal Agriculture Research Council, Khumaltar, Lalitpur, Nepal
LM-508	Rathndra Chandra Talukdar	82/2, Baishnab Ghata Bye Lane, Calcutta 700047, India, Email: rath-tal@yahoo.co.in
LM-509	Krishna Kanta Panthi	Himal Hydro, Ekantakuna, Lalitpur, Nepal, Email: Krisna.panthi@geo.ntnu.no
LM-510	Manohar Shrestha	Butwal Power Company, Lalitpur, Nepal, Email: manohar-shrestha@hydroconsult.com.np
LM-511	Umemura Jun	College of Engineering, Nihon University Tamura-machi, Tokusada, Kariyama, Fukushima 963-8642, Japan, Email: jumechang@aol.com
LM-512	Bhuban Prasad Dhakal	Butwal Power Company, Kkumaripati, Lalitpur, Nepal, Email: bhuban_t@hotmail.com
M-513	Arun Dangol	Kritipur Municipality, Ward no.11, Panga, GPO Box 11545, Kathmandu, Nepal
LM-514	Harris Steven	Hydro Consult (P). Ltd, Ekantakuna, Lalitpur, Nepal, Email: umnjars@wlink.com.np
M-515	Padma Prasad Sharma	Dibyanagar VDC -1, Jyotinagar, Chitwan, Nepal
M-516	Prakash Chandra Ghirnire	Institute of Engineering, Pulchowk Campus, Lalitpur, Nepal
LM-517	Emerman Steven Howard	Department of Biology and Environmental Sciences, Sympson College, Indiana, LA, Iowa 50125, USA, Email: emeraman@sinipson.edu
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LM-521	Matrika Prasad Koirala	Department of Geology, Tri-Chandra campus, Tribhuvan University, Kathmandu, Nepal, Tel: 4268034 (0), Email:koiralamatrika@hotmail
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LM-524	Willett Rdward	Cairn Energy PLC, 50 Lothian Road, Edinburgh, EH3 9BY, UK, Email: ewillet@cairn-energy.plc.uk
LM-525	Maheshwor Khanal	Department of Environment Science, Amrit Science Campus, Tribhuvan University, Kathmandu, Nepal, Tel: 4354935 (R); Email: maheshworkhanal@gmail.com
LM-526	Ananta Man Singh Pradhan	Central Department of Geology, Tribhuvan University, Kathmandu, Nepal, Tel: 4332449 (O); 4433650 (R), Email: anantageo@yahoo.com
LM-527	Desh Raj Sanyok	Maitidevi, Kathamndu, Nepal, Email: drsonyk@hotmail.com
LM-528	Masaru Yoshida	Department of Geology, Tri-Chandra Campus, Ghantaghar, Kathmandu, Nepal, Tel: 4220476, Home address: 147 – 2 Hashiramoto, Hashimoto 648, Japan, Tel: 008 1-736-36-7789 , Email: gondwana@oregano.ocn.ne.jp
LM-529	Yadab Prasad Dhakal	Gauradaha VDC -7, Jhapa, Nepal, Tel: 023-581876, Email: Ydhaka12OO2@hotmail.com; Ydhakal2002@yahoo.com
LM-530	Ganesh Raj Joshi	Department of Environment Science, Tri-Chandra Campus, Tribhuvan University, Ghantaghar, Kathmandu, Nepal, Tel: 4232414 (O), 4492983 (R), Email: ganeshrjoshi@yahoo.com; grjoshi1975@yahoo.com
LM-531	Ujwala Bajrachrya	Bhaktapur, Itachhen Tole 17, Nepal, Tel: 6611302, Email: ujwa1abajracharya@hotmail.com
AM – 58	Arjun Kumar Limbu	Gyaneshwor, Kathmandu, Nepal, Email: Arjunlimbu@hotmauil.com

Note: LM- Life Member; M- Member; AM-Associate Member

OBITUARY

Late Mr Ram Lochan Prasad Tandukar

LM-32

Date of Birth: 04-12-2000 B.S

Education: M. Sc (Mathematics), 1963,

Tribhuvan University

M. Sc. (Tech.) Geophysics, 1967,

Andhra University

Training: Geochemical Methods of Prospecting, Czechoslovakia

Profession: Geophysicist

Services: Senior Geophysicist at the Department of Mines and Geology

Award: Mahendra Vidya Bhushan (M. Sc. First Class)

Major Contributions: Mineral Exploration Development in Nepal

Publications: Various papers published in the Journal of Nepal Geological Society

04/12/2000 BS – 01/12/2060 BS

OBITUARY

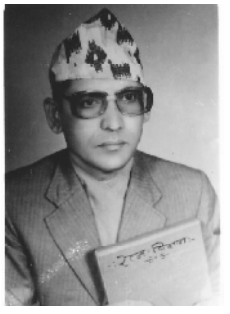
Late Mr Dharanidhar Sharma Chudal
Associate Member of NGS

Date of Birth: 02 -05-1994 B.S.

Place of Birth: Hangpang, Taplejung

Profession: Mining Expert

Major Contributions: In the field of Development of Mines in Nepal since 2033 B. S.



2/5/1994 BS – 3/11/2061 BS

GEOTECHNICAL PRODUCTS WITH PROFESSIONAL SUPPORT

Applications	Products														
	Box Gabions	Sack Gabions	Reno Mattresses®	Geotextiles	Geomembranes	Geogrids	Drainage Geocomposites	Hexagonal Wire Mesh Double Twisted	Roadmesh®	Terramesh System® and Green Terramesh®	Geomats Macmat®	Flexmac™ 2000	Biomac® Biomats	Wiland® Fibres	Steel Wire Mesh
Defensive Military Works	✔									✔		✔			
Civil Emergency Works		✔		✔								✔			
Fencing								✔				✔			✔
Camouflage										✔	✔		✔		
Bridge Abutments	✔					✔				✔					
Improving of Soil Bearing Capacity				✔		✔									
Gravity Retaining Structures	✔														
Soil Reinforcement				✔		✔				✔					
Embankment Foundations				✔		✔									
Rockfall Protection								✔							
Bank Protection	✔	✔	✔	✔						✔	✔				
Channel Linings			✔	✔	✔						✔				
Coastal Protection and Marinas	✔	✔	✔	✔											
Drainage Systems	✔			✔			✔								
Water and Pollution Control					✔										
Landfills	✔		✔	✔	✔	✔	✔			✔	✔		✔		
Erosion Control	✔									✔	✔		✔		
Shotcrete and Rigid Pavement Reinforcement														✔	
Flexible Pavement Reinforcement				✔					✔						

Environmental Solutions

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